

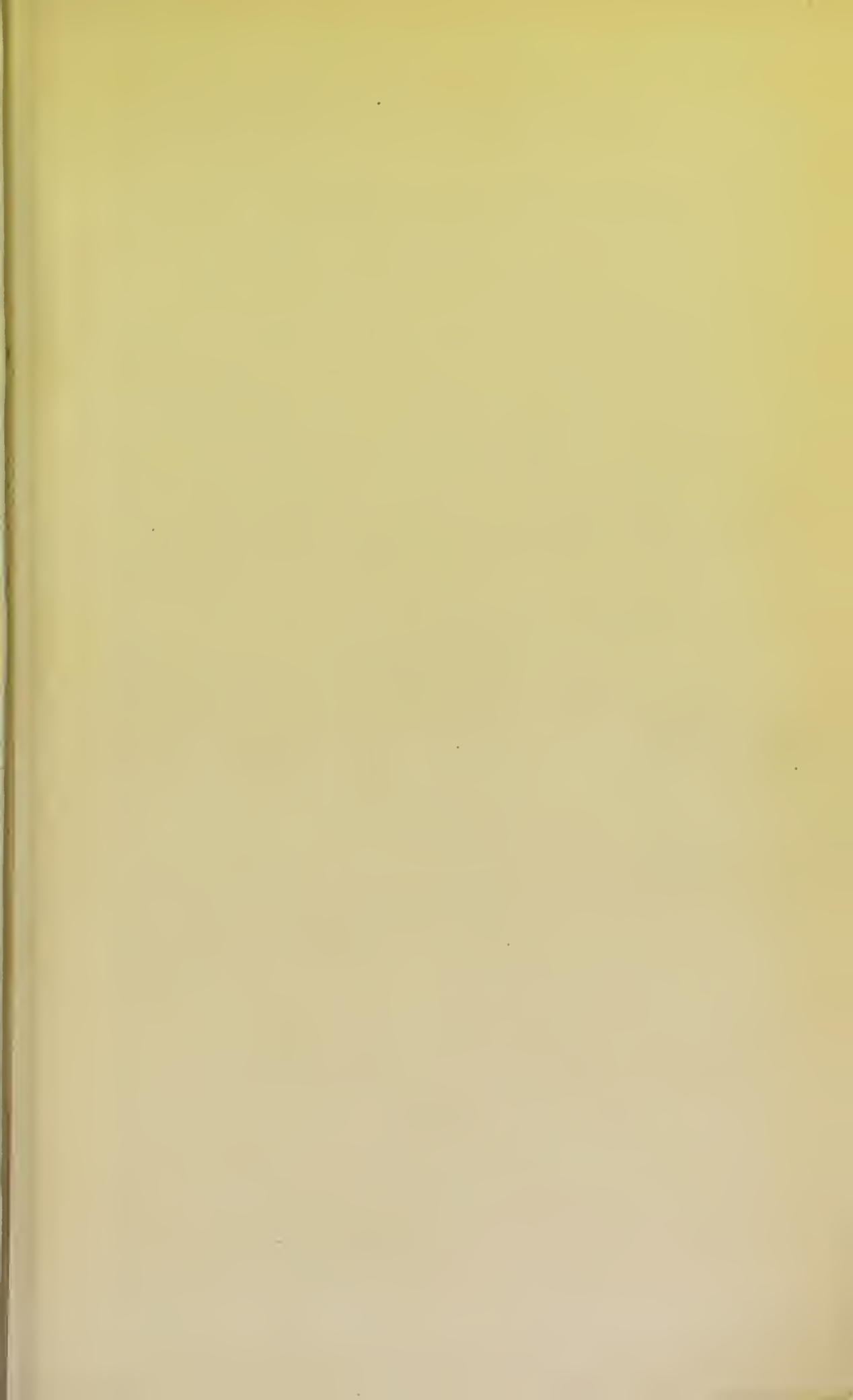
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SANATORIA FOR THE TUBERCULOUS

NOTE.

In order to convert the metrical measures referred to in descriptions of Sanatoria into British measures, the following data may be useful :—

100 metres	=	<i>ca.</i> 328 feet.
100 sq. metres	=	<i>ca.</i> 1076 sq. feet.
100 cub. metres	=	<i>ca.</i> 3530 cub. feet.
100 ft.	=	<i>ca.</i> 30·5 metres.
100 sq. feet	=	<i>ca.</i> 9·3 sq. metres.
1000 cub. feet	=	<i>ca.</i> 28·3 cub. metres.
1 acre	=	<i>ca.</i> 0·4047 hectare.
1 hectare	=	<i>ca.</i> 2·47 acres.

FIRST EDITION, *January*, 1899; SECOND EDITION, *July*, 1901;
THIRD EDITION, *May*, 1905; FOURTH EDITION, *October*, 1913.

SANATORIA FOR THE TUBERCULOUS

INCLUDING A DESCRIPTION OF MANY
EXISTING INSTITUTIONS

AND OF

SANATORIUM TREATMENT IN PULMONARY
TUBERCULOSIS

BY

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COUNTY COUNCIL; LATE PHYSICIAN TO THE MOUNT VERNON HOSPITAL FOR
CONSUMPTION AND DISEASES OF THE CHEST, AND TO THE
CROOKSBURY SANATORIUM

FOURTH



EDITION

ENTIRELY REWRITTEN



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SOME OPINIONS OF THE PRESS ON THE FIRST EDITION.

"This book represents the result of a most painstaking inquiry on the part of the author into the institutions for the treatment of consumptive patients. The various sanatoria are described with a great amount of detail, more especially with regard to situation, charges, access, etc. The book is intended for the professional and lay reader—both these may confidently rely upon getting much information from it. It will probably also have a very wide sphere of usefulness in showing the physician where he can have his patient healed at most moderate cost in the most enlightened manner. By indicating the relative merits of such institutions, Dr. Walters has performed a service for which the medical profession ought to be grateful."—**Nature**.

"Dr. Walters set himself a very difficult task, and he has accomplished it in a most praiseworthy manner. The author has evidently spared no pains in collecting the information, and a most valuable guide to such institutions is the result, probably the best that has hitherto been written. The work is a valuable one to all practitioners. In addition to the written descriptions, numerous illustrations and plans of the resorts are given. The means of approach are also given. We can confidently recommend it to our readers."—**Lancet**.

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"An extremely useful work. Many useful hints are given in the book as to the choice of suitable sanatoria."—**St. Bartholomew's Hospital Journal**.

"Brings before us in a well-arranged manner the most modern methods of hygienic treatment of consumption."—**Health**.

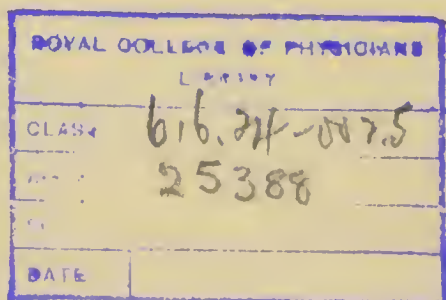
"A work which no self-respecting and conscientious practitioner can afford to be without."—**Journal of Balneology**.

"Not only has the author gathered together a vast amount of information which, but for his laborious inquiries, would have been quite inaccessible to ordinary readers, but this information is exactly of the sort which is required by those on whom the responsibility is cast of deciding what is to be done with persons suffering with consumption."—**The Hospital**.

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"We can heartily recommend Dr. Walters' work to the careful study of our readers."—**The British Physician**.

"A most laborious and generally admirable treatise."—**Spectator**.



PREFACE TO THE FOURTH EDITION.

OWING to the vast extension of the antituberculous machinery in various parts of the civilized world, it has been necessary to rewrite the present edition. The opportunity has also been taken to give a more complete description of the principles and methods of sanatorium treatment.

The National Insurance Act, 1911, has given a great impetus to the sanatorium movement in this country, and so many temporary arrangements have been made that the descriptions in this volume are bound to be incomplete in many respects. There has been no less activity in some other countries of Europe, and in the United States of America.

It is impossible to thank individually all those who have kindly given me information for the present edition ; but my thanks are specially due to the Medical Officers of Health and Tuberculosis Officers in various parts of this country, to the Directors of the various sanatoria described, to Dr. T. Henry Jones, Dr. Leslie Mackenzie, Sir W. S. Thompson, the Director of the Administration of the Assistance Publique of Paris, Dr. Guinard, Dr. Hermann Biggs of New York, Dr. Schröder of Schömberg, Prof. Saugman of Copenhagen, Dr. Kuthy and Dr. Menyhért Szants of Budapest, Dr. Pynappel, Dr. Birger Oeverland, Drs. Waller, Wadstein, and Buhre, Dr. Castells, and Dr. Malo de Poveda.

The reports to the recent International Tuberculosis Conferences have been freely made use of, as well as various articles in the "British Journal of Tuberculosis," Dr. T. S.

Carrington's "Report on Tuberculosis Hospital and Sanatorium Construction to the National Association for Study and Prevention of Tuberculosis, U.S. America"; "The Tuberculosis Directory" of the same Society; "Paris Charitable et Prévoyant" (Plon Nourrit et Cie); the official report on Sanatoria for Tuberculosis in Germany, and the late Dr. Bulstrode's report on the same subject to the L.G.B. in London.

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SECTION I.—INTRODUCTORY.

CHAPTER I.

SCOPE OF SANATORIUM TREATMENT.

SANATORIA for pulmonary tuberculosis are primarily intended for treatment, but have also prophylactic and educational functions.

The treatment they provide is largely hygienic—dust-free, pure air day and night in all weather, an abundant dietary, graduated rest and physical training—but it also includes whatever surgical, medicinal or inoculation treatment experience has shown to be useful in pulmonary tuberculosis.

The prophylactic value of the sanatorium depends partly on segregation of dangerous cases which have no suitable home-quarters, but much more on the teaching given as regards disposal of sputum and prevention of the spread of infection. Moreover, the hygienic teaching given to a patient when discussed with his friends, helps to prevent others from falling ill in the same way.

Educationally the sanatorium is useful in teaching patients how to prevent relapses, and in training medical men, nurses, district visitors and others how to manage a tuberculous case.

Although originally intended for early and easily curable cases, it has been found impossible to limit admissions to this class. A modern sanatorium requires at least two more or less separate departments: one for the rest cure of those who are feverish or otherwise unfit for exercise; and another for physical training by graduated exercise. The same patient may need rest at one time, exercise at another; and it may be necessary to transfer him temporarily from one department to the other. Moreover it is often almost impossible to tell without actual trial whether an early

case will recover, or a late case fail to improve under suitable treatment. Were we to limit admission to early afebrile cases, very few would enter a sanatorium; were we to refuse admission to all severe or advanced cases, we should exclude many who eventually do well there. It is not advisable to admit those who (without special tendency to tuberculosis) are merely in need of change of air; but there are good reasons for admitting those who are only threatened with tuberculosis; for they have an infinitely better chance of becoming robust if they have been trained in a sanatorium.

Mere pleasure seekers, and those who will not submit to a regulated life are best excluded. Non-tuberculous visitors are only admissible if they are delicate, or if they minister to the comfort or happiness of other patients. The moribund, or those who are manifestly not going to recover, should be kept at home if the conditions there are suitable, or otherwise within easy reach of their friends in a Home for Advanced Cases.

Owing to the necessity of being near centres of population most hospitals—even most consumption hospitals—have been erected in situations which are by no means the best for the hygienic treatment of the tuberculous. If they were to be built at the present day, many would be placed in more suitable neighbourhoods. Some convalescent homes and hydropathic establishments are quite suitably placed for the open-air treatment of phthisis, and might with a little modification be adapted to this purpose. But the class of visitors which they receive, and in some cases the inadequate provision of shelter against wind and weather, would make it difficult to treat consumptives there satisfactorily. Many of those who go to a convalescent home do not need the special arrangements of a sanatorium. Hydropathic establishments, too, are intended for a widely different class of visitors, whose dietary is often by no means the best for the average tuberculous patient; and in a different way this is also true of hotels and boarding-houses in health resorts. Such establishments are primarily intended for the reception of pleasure seekers, whose predominating presence is a serious hindrance to the systematic treatment of phthisical visitors. In a sanatorium the main object is the recovery of health; and for tuberculous

patients and their advisers this is a sufficiently difficult task, to which everything else must be subordinated.

Treatment in a sanatorium is not indispensable to recovery ; but it is a great help in all difficult cases, especially to those who are not wealthy.

It is a financial impossibility to provide one or two patients at home at reasonable cost with the systematic treatment they would obtain in sanatoria, and although some patients may be able to do without these aids to recovery, there are stages and forms of the disease in which it would be most unwise to discard them, if they could be found within a reasonable distance from home. Even ordinary treatment at home, if properly carried out, is more expensive than is usually realized ; and this is without any special shelters or conveniences for exercise in the open air ; often without skilled nursing in case of feverish attacks, or sudden hæmoptysis ; and without systematic training or graduated exercise, which indeed can scarcely be carried out under the circumstances. Once it is admitted that these measures are of value in restoring the consumptive to health—and this can scarcely be disputed—it follows that special institutions are needed to put them within the reach of those who cannot afford a special establishment of their own.

SECTION II.—SITE AND CLIMATE.

CHAPTER II.

CLIMATES FOR TUBERCULOUS PATIENTS.

IN his book on "The Consumptive and His Treatment,"¹ Dr. Léon Petit says: "We are nowadays convinced that there is no climate, however favoured, which alone can cure consumption". I may add that there is no climate which is equally suited to every case of pulmonary tubercle. People in health differ greatly in their powers of reaction, so that the same climate may be bracing to one which is depressingly cold to another. Amongst the tuberculous there are even greater differences to be found. In some cases, a mild equable climate is essential; whereas for most of the more hopeful cases, a cool bracing climate will be best, although this must be associated with plenty of shelter against wind and weather. It is a mistake to suppose that consumptives generally do best in warm climates. Pulmonary disease runs a relatively rapid course in warm climates; and patients who have gained weight in winter often lose it when the warmer weather sets in. In this respect England compares favourably with Italy and the south of France. Phthisical patients from the cooler parts of Germany are said to do badly at the Riviera; and the same thing has been observed of those who go there from the north of France. Some years ago a number of selected cases were sent from the Brompton Hospital to Madeira; but most of them were the worse for their change of climate. A similar result is said to have followed in the case of some hospital patients sent from Manchester to Bournemouth. The health resorts which have been most successful in the

¹ "Le Phtisique et son Traitement Hygiénique," Paris, 1895, p. 49.

treatment of diseases of the lungs are almost without exception places which are cold, or at all events cool, during some part of the twenty-four hours. This is true of Alpine health resorts, elevated tablelands in various parts of the world, German hill sanatoria, and many places with marine or semi-marine climates.

On the other hand, cold places do not suit every patient. Chilling the body lowers the resistance against microbic diseases; and the degree of cold which chills depends on the individual power of reaction. Patients with feeble circulation and much reduced in strength will usually survive longer in a mild climate than in a cold one. Unfortunately health resorts with a generally mild climate are usually ill-equipped for exceptional cold. Visitors have been half-frozen in Italy and Georgia, and chilled with cold winds on the Riviera. Confining our attention to the localities which have the reputation of benefiting the more curable cases, we find they possess certain common features which we are justified in regarding as essential. (1) They have a pure air, free from dust and smoke and the impurities which are inseparable from a dense population; (2) they are fresh and bracing, but well protected against cold or stormy winds; (3) they have sufficient fine weather, or sufficient artificial shelter, to render an out-of-door life attractive; and (4) they have a dry, warm, well-drained soil. Wherever these four conditions are found, and suitable arrangements can be made, it should be possible to treat the tuberculous with success. Neither high altitude, dry atmosphere, fine weather, equable temperature, nor abundant sunshine is essential to success, however useful they may be, or desirable in particular cases. Were high altitude an essential, we should not hear of recoveries on the ocean, or in low-lying health resorts. Were fine weather a *sine qua non*, the remarkable success of the sanatoria in the Black Forest and other parts of Germany would never have been chronicled. Many of these have a moist and chilly climate during part of the year; but patients do just as well at such seasons as during finer weather. When Dr. Otto Walther was at Nordrach, a medical visitor asked him what he did with his patients in bad weather. "Bad weather?" he replied, "all weather is good." A dry atmosphere makes out-door life more pleasant; but it will not prepare the patient for an open-air life in a moist and

variable climate. Places with a warm dry climate are nearly always dusty and have a wide daily range of temperature. Moist still air is soothing to irritable air passages; intense cold, mountain fogs, snowstorms and the like, need not interfere with treatment if patients are warmly clad and well sheltered, and can keep warm. The most agreeable climates are not the most favourable to health and longevity, but the variable temperate climates. Windy places however are not suitable for open-air treatment, unless the patient is robust; and a hot moist atmosphere is also a hindrance. Of greater importance than the climate is the use which is made of it; and with the help of artificial shelters in most places we may be independent of continued bad weather. Consumptives have been cured in the most unlikely climates; and many things point to the conclusion that fresh air and medical supervision are of much greater importance than a fine climate.

This statement is not intended to imply that climatic characters are of no value; but rather that they are not of paramount importance in most tuberculous cases. Alpine climates, for example, are unrivalled in their beneficial influence over certain forms of the disease; but they are by no means universally indicated. The value of Alpine health resorts depends partly on characters which are common to some other stations. Their peculiar characteristic is a rarefied atmosphere which necessitates unceasing breathing exercise; but their tonic influence, their cool air with a warm sun, their atmospheric dryness and purity, their freedom from dust and from strong wind, are possessed in various degrees by places at lower levels. It is most unwise to recommend the Alps indiscriminately to every tuberculous patient. To obtain benefit from such a climate a certain degree of reactive power is essential; and just as many people cannot without previous training get a proper reaction after a cold bath, so it is with an Alpine climate. Sir Douglas Powell indeed has said: "Notwithstanding the enthusiasm with which cold mountain climates have been of late years advocated for the treatment of consumption, it remains certain that those resorts are not adapted for the majority of patients, as they come before us, suffering from this disease; and perhaps it might with truth be said that a large number of the very cases that do well

aloft do equally well in the plains".¹ "In order to reap the benefit of high altitudes, patients must be free from pyrexia, and possess sufficient lung surface to carry on adequately the process of respiration in the attenuated atmosphere."² Those who are markedly febrile, who have feeble circulation, damaged kidneys, large cavities or extensive lung disease, rapidly advancing lung destruction, laryngeal complications, or irritable nervous systems, do badly at Alpine resorts. Most of the existing sanatoria are not placed at high altitudes, as will be seen in the descriptive portion of this book.

In comparison with Davos and the German hill sanatoria, many health resorts at lower levels are at a disadvantage, owing to the absence of proper provision for the hygienic treatment of consumptives. When this defect has been remedied, it will probably be found that they too, as well as others yet untried, have an important part to play in the battle against tuberculosis. "There are many places in this country where, on a dry soil and in a sunny sheltered part, on the southern slope of some upland, most of the conditions can be obtained which are now dearly bought and far sought, and often not obtained, in distant parts of the world."³

¹ "Diseases of the Lungs," 4th ed., 1893, p. 513.

² C. Theodore Williams, "Practitioner," June, 1898, p. 627.

³ A. Ransome, "The Treatment of Phthisis," London, 1896, p. 138.

CHAPTER III.

TREATMENT IN HOME CLIMATES.

THERE are some very strong reasons for the treatment of tuberculous patients in their own country.

Many of them are quite unfit to take a long journey ; and this is very often true in quite early stages of the disease. So long as there is well-marked fever, or fatigue after slight exertion, or a feeble circulation, a long journey must be full of risk. The presence of inflammatory complications is also a contra-indication, or persistent or recent and copious hæmoptysis. To those patients who cannot afford to travel comfortably, a long journey will always be undesirable. In a long land journey the intermediate halting places are often of a most unsuitable kind. Average hotel accommodation is far from ideal for the tuberculous or delicate. The larger rooms in even good hotels are frequently left to ventilate themselves ; the bedrooms may have been previously occupied by visitors suffering from influenza or other infectious complaints. "It is not too much to say that they are most unsuitable places in which to make an extended sojourn."¹ Even hotels which have been specially built for the reception of delicate persons or invalids often leave much to be desired. For the tuberculous dyspeptic, dietetic treatment is of great importance : but a suitable diet is often difficult to obtain during a journey.

In a sea voyage passengers are greatly at the mercy of the weather. The average cabin is too small and ill-ventilated to be suitable for the subject of lung disease, who may in stormy weather be much worse off than at home. There is often great danger of chill in passing from the sheltered to the more exposed parts of the

¹ "The Climate of the Dwelling-house," by G. Vivian Poore, "Journal of Balneology and Climatology," October, 1897.

vessel in windy weather. In traversing the tropics the extreme heat is ill borne by delicate passengers. The fare on board ship is often very good for healthy people; but for many invalids it is by no means suitable; while the monotony of the voyage and the absence of effective medical supervision lead some to spend an undesirable proportion of their time in drinking and smoking in ill-ventilated saloons. Before we recommend a weak-chested patient to take a long voyage, we must take into account his purse, tastes and inclinations, his seafaring capacity, the probability of good weather or the reverse, and his ability and willingness to conform to the necessary hygienic rules.

When the patient reaches his journey's end, it will make a great difference whether he goes to a medically supervised sanatorium or is left to the tender mercies of chance and his own medical skill. To send a feeble patient to rough it in the colonies is obviously wrong, even if he is likely to be allowed to land there. Equally so would it be to expose him, even in the best of climates, to the temptations of sight-seeing and the injudicious pursuit of pleasure. In either case he would have been far better in his native country. Climate is but one factor in treatment, and accommodation, diet, and above all the use which the patient makes of his time, are at least of equal importance. Without systematic medical supervision, the sojourn in a foreign health resort is nearly always a mistake for a tuberculous patient. Dr. Knopf states that in Colorado there is an enormous difference in the mortality among phthisical patients under systematic medical treatment, as compared with those who merely consult a physician when they think it necessary; and the same is borne out by the late Dr. Solly's statistics.¹ But even if the patient can safely travel, and is under medical care, there are still some arguments in favour of treatment in home climates. As a rule (although there are exceptions) it is more expensive to go abroad for treatment; and many patients may consequently have to curtail the time of systematic treatment. National tastes, and even national prejudices, have also to be considered, and the depression which arises when the average patient is separated from his friends and

¹ "Medical Climatology," London, 1897, pp. 133-41; Knopf, "Les Sanatoria pour la Phtisie Pulmonaire," Paris, 1895.

relatives. A more important argument is drawn from the liability to relapse which is shown amongst patients who attempt to live in a damp and variable climate after treatment in sunnier lands. Many of the foremost physicians abroad are agreed as to the desirability of attempting the cure of consumptive patients in their own country. This opinion has been expressed by Prof. v. Leyden, Prof. v. Ziemssen, Prof. Naunyn, Prof. Senator, Dr. Dettweiler, Dr. Gerhardt, Dr. Fränkel, Dr. Knopf, and other authorities, and is widely accepted by British practitioners.

When the fund was started for the erection of a sanatorium at Davos for German consumptives of the poorer classes, Germany had no Alpine sanatoria, while it was known that the sanatorium would be supervised by a German doctor; yet an influential protest was raised on medical grounds against its erection, lest it should lead to neglect of the sanatoria in Germany itself, which it was felt were of greater importance.¹

¹ "Heilstätten-Correspondenz," Berlin, Dec., 1897; Jan. and Feb., 1898.

CHAPTER IV.

SITES FOR SANATORIA.

A SANATORIUM for tuberculous patients should be placed on dry soil, in a sheltered situation, with pure, fresh, bracing air. The best soil is sand or rock, as with a proper fall these are not retentive of moisture, and are consequently soon dry after rain and warm to the feet. Rising ground should be chosen, with a southerly aspect, and good shelter from hills or woodland against cold or boisterous winds. The question of altitude has already been considered (see chap. II.). Various elevations according to geographical position have been recommended by Liebermeister, Brehmer, Weber and others. As, however, their reasoning is partly based upon theoretical considerations, it is not necessary to reproduce their figures here. Moreover, as we have already said, many different elevations would probably be needed to suit various degrees of reactive power and lung capacity.

Existing British sanatoria vary in altitude from just above the sea-level to nearly 275 metres (900 ft.). Those in Germany from a low level to about 790 metres (2600 ft.); while most of the Swiss sanatoria are between 600 and 2000 metres altitude (2000 and 7000 ft.). Where a high hill is available, it by no means follows that the top is the best place to choose. A slightly lower situation is often both more sheltered and less rainy. Cornet of Reichenhall pointed out¹ that there were often strong winds at the top and at the foot of a mountain; and to a smaller extent this may be true of lesser elevations. Blumenfeld recommends for North Germany the south side of a hill 400 metres (1300 ft.) high. The local configuration of the land, as well as the geographical position, have a

¹ Budapest International Congress of Hygiene and Demography.

great influence over climate. A small hill in the plains may be more breezy than a high one amongst the mountains.

Nearly all the British health resorts which have a reputation for the treatment of pulmonary tubercle are on or near the coast. A great advantage of the seaside, also shared by hilly inland country, consists in the recurring breezes which purify the air and increase the bracing effect. Local tubercloses do exceedingly well on the sea-shore; but for pulmonary disease the immediate and unprotected sea-front is not the best. Dr. Ransome has written in strong terms about the danger of such a situation; and other older authorities—Walshe, Beneke, Fodéré—were equally emphatic. Where the bracing qualities of seaside air are combined with sufficient wind-shelter, consumptives will probably do well; but places of this kind are quite exceptional, so that most of the existing British, German and American sanatoria have been placed inland.

Purity of the air is of paramount importance. For this reason the neighbourhood of a large town or factory is inadmissible, or the presence of organic refuse near by. One of the drawbacks to the treatment of the weak-chested in popular health resorts is the increasing contamination of the air from growth of population. As Léon Petit says: "We are nowadays convinced that there is no climate, however favoured, which alone can cure consumption. The places which are free from tuberculosis are those where the scanty population lives constantly in an atmosphere which has not yet been polluted. They attract invalids, and when they become fashionable they have long since lost the qualities which gave them renown."¹

No sanatorium should be near a high road; in dry weather the dust is sure to fly up and increase the tendency to useless cough. A large extent of grass or heather land round the sanatorium is an advantage in preventing dust from rising.

High chalk downs have been recommended by some for the treatment of pulmonary tubercle. They are, however, open to two important objections. In dry weather the short grass of such land is insufficient to prevent the dust from flying up; while in wet weather the soil remains cold and damp, and the air above it is apt

¹ *Loc. cit.*, pp. 49, 50.

to be foggy. A gravel patch near a marsh or in an ill-drained depression would be unsuitable. The character of the vegetation is a useful guide to the underlying soil. Where pine trees abound the soil is usually sandy and dry; and these trees are useful in other ways, as they give more permanent shelter against wind and rain, and are active producers of ozone. Some people also believe that their terebinthinate secretions are curative; although this is not quite so well established. The late Dr. C. T. Williams has pointed out that where gorse and heather and short springy turf abound, the locality is usually suitable for consumptives, whereas long rank grass should be avoided. It must be remembered that an underlying stratum of clay may render a sandy soil unsuitable for delicate patients. Soil and shelter are the two most important points in choosing the site for a country sanatorium.

But if a country place is the most suitable, it must be reasonably accessible to prevent the need for a long journey. The sanatorium, however, should not be close to a railway.

The *aspect* of the sanatorium is chiefly of importance in providing shelter against strong wind. In a sheltered spot the aspect matters nothing to the patient who only occupies his bedroom at night. To one who cannot be moved the early morning sun is grateful, while the low rays of the setting sun in summer may be trying. For this reason a S.S.E. aspect may be best for a large block. In the case of chalets and cottages with windows on all sides it is of little importance. One of the American sanatoria has no bedrooms, only dressing-rooms surrounded on all sides by deep verandahs in which the beds are placed. Walther of Nordrach declares that patients make as good progress in rooms of one aspect as in those of another; however, he adopted a S.S.E. aspect for his "Anstalt," so that the afternoon sun fell aslant along the roof in summer, but shone into the bedrooms in winter. At the Antipodes the conditions are, of course, reversed.

The aspect of a verandah or shelter may be of more importance than that of a bedroom. Feverish patients must be kept in a cool place during the heat of a summer day; otherwise they do not make good progress. Chilly bed patients during the colder months require all the sunshine that is available in this country.

The grounds also should be well sheltered against cold or violent winds. It is of the first importance that patients should be able to get sheltered walks in windy weather; and some of these walks must be fairly level.

On the other hand, unless the building is sufficiently raised to command a view, it will be unnecessarily depressing to those confined to bed or couch. Moreover, part way up the side of a hill is drier than the base, and less exposed than the top.

A treeless site is under great disadvantages for sanatorium purposes; but the trees must not be crowded round the building in such a way as to prevent free ventilation.

There must be a sufficient fall from the sanatorium to a suitable spot for disposing of the waste water, and of the sewage if water borne. It will be exceptional to have a main drain in the neighbourhood. The water supply must be pure and abundant.

Sanatoria in isolated situations possess great advantages in the treatment of consumptives, who are apt with the best intentions to do most unwise actions, and to be led astray by the example of visitors of a different kind. The ordinary amusements of a health resort—theatres, concert-rooms, skating-rinks, casinos and even public-houses—may present fatal temptations to the phthisical. No working-class sanatorium should be placed near a public-house. "Alcoholism is the handmaid of tuberculosis."

CHAPTER V.

THE SANATORIUM GROUNDS.

THE acreage required for the grounds of a sanatorium will depend somewhat upon the amount of open public land in the neighbourhood. The grounds of the Brehmer Sanatorium at Görbersdorf amount to about 300 acres; and some of the American sanatoria have very extensive grounds. Land is, however, too expensive in this country for such luxurious proportions: and a much smaller area will suffice if it is of the right kind, and not surrounded with houses. Brehmer laid stress on the importance of carefully graduated walking exercise to strengthen the heart of the consumptive. For such a purpose it is advisable to have a reasonable length of level paths, and a number of others at various easy gradients, so arranged that the patient can take walks, increasing in length and in difficulty, if possible returning down hill to the sanatorium. Gradients of more than 1 in 8 or 10 are too steep for most patients. The paths should be marked out in distances of about fifty yards near the building; and groups of alternative walks varying in length and difficulty prepared in the neighbourhood. The grounds should be freely provided with seats and shelters, and covered walks for exercise in rainy weather are also useful. In the Brehmer Sanatorium there are seven kilometres (four and a half miles) of walks, and a seat every twenty paces, besides large winter gardens and shelters for wet weather. Trees and bushes—preferably evergreen—should be so arranged as to give shelter against wind while they permit the free access of sunshine and air. In these comparatively sunless islands, every ray of sunshine should be utilized to the utmost: for if it be not essential to recovery, it is always grateful to chilly subjects, and the best of Nature's disinfectants.

Walking exercise—even hill climbing—is not now considered

sufficient in this country for the comprehensive treatment of tuberculous patients. The best results can only be obtained by the addition of graduated labour at a suitable stage of recovery. A farm or large kitchen garden with several acres of ground is essential for this purpose; and a sand pit, gravel pit or chalk pit or piece of woodland will also be useful. In sanatoria for gentlefolk, putting greens and croquet lawns are often provided; a golf course in the neighbourhood is also a legitimate attraction.

SECTION III.—THE BUILDINGS.

CHAPTER VI.

CONSTRUCTION, DECORATION AND FURNITURE.

EVERY part of a sanatorium should have abundant independent ventilation, and be readily cleansable without raising dust. The patients' quarters should be quiet, easily accessible from the grounds, and freely open to the sunshine while sheltered from wind.

Dust is irritating to the respiratory organs, and increases cough. Owing to dyspnœa and the prevalence of nasal obstructions, temporary or permanent, mouth breathing is very common among the subjects of pulmonary tubercle; and the throat is ill-adapted to dispose of inhaled dust. Organic dust, such as is found in most inhabited rooms, contains many bacteria, some of which are capable of starting mixed infection if they settle on damaged mucous surfaces. Moreover, such dust forms a possible culture medium for the tubercle bacillus, which has been shown by A. Ransome¹ to be capable of growing outside the body at room temperatures. Apart from this, the tubercle bacillus survives longer when shielded by dust and dirt from sunlight and from drying wind.

For these reasons, sanatorium rooms should be kept free from dust with wet cloths, and should be so arranged and managed as to make this easy.

There are two chief types of sanatorium, the one a modified cottage or shed, while the other is modelled after the hospital or hotel. Each type has its own advantages and disadvantages, so that many intermediate forms have been devised by way of compromise. In the chalet or cottage sanatorium the administrative portions are necessarily distinct from the patients' quarters, whereas

¹ "Tuberculosis," Feb., 1907.

in the hospital or hotel sanatorium they may be in one and the same building. The chief differences, however, are in the patients' quarters.

Chalets are isolated bedrooms for one, or at most, a few patients, with very little else. They have great advantages as regards quiet, privacy, amount of sunshine received, and ease of ventilation, since windows can be placed on four sides, and cross ventilation easily secured in all states of wind and weather. Moreover, it is easy to classify patients in a chalet sanatorium, and to isolate such as have developed any infectious ailment. On the other hand, the administration of such a sanatorium is inconvenient, and on a large scale scarcely practicable, owing to the much larger staff required, and the difficulties of supervision. The more scattered the rooms, the longer it takes for medical officers, matron and nurses to visit them. More dirt is introduced because of the numerous entrances; the staff is more exposed to weather; the bathrooms and sanitary pavilions are less accessible; and considerable difficulties arise in providing bed patients with warm and appetising food, and in adequately heating the rooms at a reasonable cost.

The Hospital or Hotel Sanatorium consists of one large building to accommodate the patients with or without separate blocks for administration. Its chief advantages are as regards distribution of food, heating and medical supervision. Moreover, there is usually a smaller building area; the building gives more shelter against wind; and the upper rooms may command a finer view. Fewer entrances, cloakrooms and the like, are required, and proportionately less dust is introduced from without. On the other hand, such a building is necessarily noisy, as the connecting corridors and staircases (which must be somewhat bare) conduct the sound freely; and a coughing patient is more likely to disturb his neighbours, because the rooms are nearer together. The grounds, too, are less accessible from the upper floors, unless lifts are freely used, or unless the site is so sloping as to allow of level approaches to each floor. Ventilation cannot be so free in a large building in one block as in smaller buildings, because the outer wall space is proportionally less in the former. If built on the separate block or pavilion system this difficulty is largely overcome; but noise will still travel through

connecting corridors and open windows from block to block. The best way to prevent this transmission of noise is to have corridors of moderate length with open sides, and to plant trees between the blocks. This question of noise is far more important in a sanatorium where patients may have to stay for months than in a hospital where a short stay is the rule.

A Cottage Sanatorium consisting of small buildings completely separated from one another has considerable advantages in some respects, although less easy to administer than one large building. In such a sanatorium the conditions of life approximate to those of a village, which is the healthiest place for most patients after recovery. The small buildings which receive the bulk of the patients may be almost as quiet, airy and sunny as chalets, while they are easier and less expensive to manage, though inferior in this respect to the large block sanatorium.

There is usually one large building for administration, the kitchen department, servants' quarters, and sometimes also the nurses' quarters. The dining-hall may be connected with the kitchen, though it sometimes forms a separate block.

Very commonly a block is added for the specially febrile patients. The chief drawback to this type of sanatorium is that patients or members of the staff are exposed to the weather in passing between the cottages and the administration building. Sanatorium patients are, however, usually encouraged to go out in all weather, and never suffer from this (in my experience), provided they can change their garments or put on extra wraps over their wet clothes. Members of the staff cannot study their own comfort while on duty, so that the provision of covered ways (which is usually possible) is a distinct advantage.

Number of Stories.—High buildings are unsuitable for a sanatorium unless passenger lifts are freely used. Much more exertion is required to walk up stairs than along level ground, so that without a lift many patients on upper floors would be prevented from visiting the grounds. It should always be possible in a sanatorium to draw patients in bed into the open air. This is often difficult in the upper part of a tall building, especially in this country, where overhanging balconies darken the rooms below. Tall buildings

block out more sunlight than low ones, and require correspondingly more space around them. In still weather the air to leeward of a tall building is less fresh than with a low one. It is stated that in a tall building the lower floors ventilate into the upper; but with freely open windows it is doubtful whether this really happens.

Rooms with floors above them are noisier than those without. As a rule no building for patients in a sanatorium should have more than two or at most three stories; and even then great care must be exercised in choosing quarters for patients in upper floors. In a healthy district, there is no objection to ground-floor bedrooms, provided that the foundations are properly concreted, an efficient damp-proof course is put in, and the floors are raised a reasonable distance from the ground and properly ventilated. Admitting that a warm building acts on the soil like a cupping-glass, air will enter more readily by open windows than through the floor. Ground-floor bedrooms, moreover, are more convenient for wheeling a patient in bed into the grounds. To devote the whole of the ground floor to common rooms is both wasteful and apt to encourage patients to stay too much indoors.

General Plan of the Sanatorium.—In a cottage or chalet sanatorium the patients' quarters should be grouped around those of the medical officer, so that he may not have far to go in case of emergency, and can keep his eye on the patients. Quarters for those who require nursing need not be within view from the doctor's room, as a nurse will always be on duty. The path by which patients return from their walks should lead past the doctor's day room, or that of a responsible nurse. The patients' work-rooms should not be near the nursing section; and the same applies to all noisy administrative parts.

The kitchen department and dining-room should be near the bedrooms of the nursing section, but far enough removed to prevent the smell of cooking from reaching them, and separated by an open space or a well-ventilated lobby. The kitchen department must be near the tradesmen's drive, for convenience of provisioning. A hidden path should lead from the nursing section to the mortuary, which should be near an entrance drive. If there is a laundry on the place, it should have a disinfecting chamber attached to it and

also the electric installation, power-house, destructor and workshop. Every country sanatorium requires its own repairing staff on the spot. If the ground allows, it is advantageous to have the heating apparatus on a lower level than the buildings to be heated, unless each building has its own plant. The power-house should not be in the same building with patients' bedrooms ; however small the installation, it should be in a separate building. It is usual to place the bedrooms for men and the maids in different buildings. In a large sanatorium the nurses have usually a separate block or building for their quarters.

The same principles are applicable to sanatoria consisting of one large building. In this case, it is usually arranged so as to give shelter from wind ; but it is not advisable to have more than 150 feet without a break, unless the site is exposed, or the building of one story. The administration and kitchen department are often placed in a separate block to the north of the main structure. The dining-room may be between the two, or in a wing, or in a separate block connected with the kitchen by a passage.

The patients' rooms are usually placed on the south side. In very sheltered situations they may form a straight line (Oderberg type)¹ or even a projecting angle or curve (New York State Sanatorium). In the Ruppertshain Sanatorium the whole building forms a shallow curve with concavity to the south.² In the East Anglian Sanatorium the two sides form a very open angle with one another.³ If wings are added to increase the shelter, they may with advantage form an oblique angle with the centre, so as to admit the sunshine freely (Hohenhonnef type).⁴ In another modification (e.g. Albertsberg Sanatorium) the wings are almost as large as the centre, and form with it an H.⁵ Quite another arrangement is that of the Massachusetts State Sanatorium,⁶ in which a number of one-story pavilions radiate from the convexity of a curved connecting corridor. In some of the pavilions, a "sun-parlour" occupies the southern end, a dining-room the north end next the curved corridor. The kitchen department is placed inside the curve. Another arrangement, met with in some of the American sanatoria, is that of a horseshoe with rather diverging prongs.

¹ p. 352.² p. 376.³ p. 216.⁴ p. 370.⁵ p. 363.⁶ p. 120.

In very large sanatoria it may be necessary to arrange groups of buildings for different kinds of patients. Thus one American Sanatorium has been planned with a view to separation of the sexes, separate quarters for negroes and for whites, and separate quarters for those requiring to be kept in bed—an eight-fold subdivision; and all these parts are arranged so as to be capable of general supervision from the common administration building.

The Patients' Rooms.—In a good modern sanatorium the patients' bedrooms form a single line, with either an airy corridor or the open air behind them. This makes it possible to have *cross-ventilation*—an essential point. Every room should have inlets and outlets on opposite sides leading to the open-air. A fanlight is commonly placed over the bedroom door, and another over the window, so that even when the latter is shut for ablutions, fresh air still passes through the room. If there is no such fanlight, the door will have to be kept open more or less permanently. A chimney with an open fire burning makes a good outlet; but this is not a good arrangement excepting in a large room, and adds to the work.

Many sanatoria have been made by converting an already existing house or mansion. This usually has rooms on both sides of the main corridor. Such an arrangement is unsatisfactory unless the doors of the bedrooms are removed or louvered or kept permanently ajar, or very large ventilating openings connect the rooms with the corridor, or (better still) if the walls next the corridor are converted into dwarf walls with a large space near the ceiling.

There is no advantage in extra thick walls to the bedrooms. Windows being always open, the sound will travel through these to the adjoining rooms. Special care should be taken with all fittings to prevent their rattling (whether open or shut) when the wind blows. Doors should be heavy, or specially contrived to prevent the noise of slamming; and in the bedrooms should be wide enough to allow a bed to be carried through. A large building with long corridors is in any case difficult to keep quiet; heavy curtains being inadmissible, and doors across interfering with ventilation. Double doors to sanatorium bedrooms are objectionable.

Number of Patients per Room.—Except for patients who have

been afebrile for a long time, there are some advantages in single-bedded rooms. To reduce fever strict rest, mental and physical, is often necessary, and this cannot be secured with several patients occupying the same room or ward. For the afebrile, wards with a number of beds will serve, provided that any patient who becomes feverish or develops a complication is promptly transferred to a single-bedded room. Patients of the working classes are said to prefer a ward to a separate room; and the ward costs much less to build. It may be subdivided by dwarf partitions as a compromise. This gives more privacy, but does not absolutely isolate, nor interfere with ventilation. For children, wards are preferable as a rule to single rooms.

Common Rooms.—But few common rooms need be provided in a sanatorium, as they may tempt patients to stay too much indoors. There should, however, be a number of open-air shelters for rest or recreation in wet weather, as well as others for work.

Day rooms will be required for the staff. In the nursing blocks, a ward kitchen should be provided to about every dozen beds, to serve also as the nurses' duty room.

The dining-room should have abundant ventilation on three or four sides. Several of its walls may consist entirely of window space, with casement windows or entirely removable ones.

Corridors and Porches.—Excepting in a very exposed situation, the windows of the corridor should be placed opposite the bedroom doors, and the ends should also be open. In a windy place, a bayonet-shaped corridor is permissible, and prevents excessive draught. Every outer door should have a porch, to admit air but exclude rain.

Cloakrooms and Lavatories should be readily accessible on the way from the grounds to the dining saloon and bedrooms, and the cloakrooms should have hot pipes or drying cupboards for damp clothes, and places for changing boots. A sufficient number of suitable closets, bathrooms and lavatories is essential. One of each to every five or six patients is a liberal allowance. The provision of bathrooms is usually inadequate in foreign sanatoria. On the other hand, complete hydropathic installations are more common abroad than in English sanatoria. Lavatories, bathrooms and closets

should be placed on the north side in built-out pavilions with dis-connecting lobbies.

Verandahs and Balconies.—Verandahs are an immense convenience in a sanatorium, enabling the patient to remain in the fresh air without exposure to rain or sun. They should not, however, in this climate be placed on the south side of the bedroom, lest they interfere with the light and ventilation of the latter. Placed in front of a vestibule or staircase, or at the end of a block, and adequately ventilated, they are useful without being mischievous. A bedroom provided with a deep south verandah should only be used as a dressing box. In such a position awnings that can be furled or removed are preferable. Wide southerly balconies projecting from the floor above are also apt to darken the room below.¹ These remarks are less applicable to climates with more intense sunlight than our own. Even here in summer time a south verandah may be too hot for proper treatment of febrile patients, so that a northerly or easterly one will then be useful. A verandah requires top-ventilation, like a green-house. One way of effecting this is to leave the ends open. Another is to make the roof in two overlapping pieces,² or to have a window behind.

A tiled terrace in front of a ground-floor bedroom is invaluable, as the bed can be brought out into the open on still days. Such a terrace should not be used as a promenade. In continental sanatoria where the site slopes rapidly, such terraces are usually placed in front of the basement or of ground-floor common rooms.

Rest-shelters.—Covered shelters for a number of patients are an almost universal feature of continental sanatoria, under the name of *Liegehallen*. They were strongly objected to by Dr. Otto Walther, on the ground that they foster gossip at a time when there should be absolute rest. Much, however, depends on the kind of patient who uses them, and on the staff.

Sleeping Shelters and rest shelters for the daytime are in some respects better than any indoor room for the tuberculous patient. Many kinds are now sold, in some of which windows are provided on all sides, while others are made to revolve, so that the windows

¹ See King Edward VII Sanatorium, Midhurst, p. 236.

² See F. R. Walters, "Sanatorium Treatment," p. 44, for figures.

may be turned away from driving rain or wind. Revolving shelters are not convenient for use at night, because a patient cannot be expected to get up and turn his shelter round if wind and weather suddenly change, whereas it is a simple matter to open one window and shut another. Fixed shelters should be large enough to allow of rain drifting in through doors or windows at an angle of 45° without wetting the occupant. They should have windows or doors on three or four sides, a sound floor raised a foot above the ground, a good roof, and the interior finished without ledges and dust-collecting angles. The walls should have a free space all round next the roof, and should be high enough to fend off wind; the windows (or window openings) should reach to the top, and come down low enough to allow the occupant to look out when on his bed or lounge chair. A convenient size for a single shelter is 12 feet \times 10 feet, for a double one 18 feet \times 10 feet.¹

Ventilation of Rooms.—It is impossible to rival the open air in its purity, but as near an approach should be made as is practicable. The ordinary allowance of 85 cubic metres (3000 cub. ft.) of air per head per hour is often regarded as a “counsel of perfection”; but for open-air treatment this is not sufficient. With open windows and open chimneys or ventilating shafts, more than this can be provided even in winter as soon as patients have learned to stand a very moderate degree of cold. Dr. Ransome states that at the Manchester Consumption Hospital as much as 500 cubic metres (18,000 cub. ft.) per head per hour was often provided;² and with the help of special arrangements there is no difficulty in improving upon the ordinary standards of indoor ventilation, high as these are above those observed in most of our private houses and hotels. In all good sanatoria the windows are kept open in all weather and seasons for the whole twenty-four hours, excepting perhaps during ablutions. Where the climate is variable, special shutters may be provided (as at Ruppertshain Sanatorium) which let in air while they exclude rain. Small glass screens might be arranged for the same purpose. Double windows are unnecessary and may be mischievous: when shut they economize warmth at the expense of ventilation.

¹ See F. R. Walters, “Sanatorium Treatment,” chapter viii.

² Weber-Parkes Prize Essay, London, 1898, p. 73.

The cubic space is of less importance than the size and position of the ventilating openings, although within certain limits the larger the rooms are made the better. The large dormitory at the Villiers Sanatorium for Children (p. 322) contains over 119 cubic metres (4200 cub. ft.) per head. At Hohenhonnef none of the patients' rooms are smaller than 69 cubic metres (2437 cub. ft.). At Nordrach, where very good results were obtained, they averaged 42 cubic metres (1483 cub. ft.). At Albertsberg and Oderberg (both for the artisan class) from 34 to 39 (1200-1380 cub. ft.) has been allowed. Patients in sanatoria spend most of their time out of doors, so that with adequate ventilation 28 to 42 cubic metres (990-1480 cub. ft.) should suffice, with a minimum of 9 to 12 square metres (97 to 130 sq. ft.) of area in the bedrooms. In shelters with large permanent openings much less will suffice. It is a great advantage if the room can be ventilated from more than one quarter, according to the direction of the wind. The air should be admitted as directly as possible from outside. The plenum system is unsuitable in a sanatorium, and has been abandoned in several chest hospitals and sanatoria. Draughts depend chiefly on the rapidity of the air current and the relative warmth of the room. They are worse in hot rooms, and may be increased by reducing the size of the inlets. In a hot room there is more draught through a chink than through a wide-open window. In very windy weather screens may be required; but windows should never be closed except for ablutions and the like; and not always then. With the bed in a sheltered position it is quite safe (and often advisable) to have both door and window open.

Heating and Lighting.—In the Continental and American sanatoria heating is usually by low-pressure steam, which is probably the cheapest method, and one of the most easily regulated. Where several separate buildings are heated by the same plant, steam heating is the only practicable method. The usual objection to steam pipes, that they cause a close smell through charring of dust particles, applies less to a sanatorium with windows freely open than to an ordinary house or hotel. Such charring can be prevented by adequate ventilation and a little care in regulating the heat. By no other method can a room be quickly raised in very

cold weather to a comfortable temperature for ablutions. In British sanatoria hot-water pipes are, however, more usual. In either case the pipes and radiators should be placed fairly centrally, not under the windows; and soft water should be used, to prevent blocking of pipes. It is also convenient if each section can be shut off and disconnected for repairs without interfering with the circulation in other parts. Closed stoves, if carefully made and managed, are less objectionable than in ordinary rooms, as with abundant ventilation the noxious fumes are quickly carried off. Open fires are most admirable ventilating contrivances. They are, however, relatively expensive; they demand more attention, and are sure to be dusty at times. In a large sanatorium they cannot very well be used excepting in the common rooms. Electrical heaters are still too expensive to be much used.

Whatever method be employed, care should be taken not to over-heat the air. There should not be more than $5-10^{\circ}$ F. between the temperature of a sanatorium room and that of the outside air, excepting in very severe weather. Moreover, in a temperate climate, the incoming air should not be warmed, as this impairs its tonic effects.

No attempt should be made to maintain a uniform temperature. Within considerable limits, variation in temperature is health-giving. In a temperate climate heating is only necessary intermittently in a sanatorium. Patients in bed do not require a warm room; nor do those who are resting with feet off the ground.

During a great part of the year in the South of England artificial heat is quite unnecessary. In cold or wet weather it is pleasant while dressing or undressing, and to keep the feet warm when sitting down to dinner. It is, however, purely a luxury to all excepting those with very poor circulation, if sufficient rugs and clothing are provided.

Abundant *light* should be admitted into all the rooms of a sanatorium; and all those used by patients should admit the sun's rays during part of the day. According to Trelat (Budapest International Congress) the light on a dull day indoors in a sanatorium should be at least equal to that of ten metre candles. At least half of one side of each room should consist of window

space. Some people cannot sleep unless the bedroom be darkened. This should be effected by outside louvered shutters or by glazed blinds, rather than by thick curtains, which hold the dust.

Artificial lighting indoors should be by electricity, as other methods add to atmospheric impurity. In the rest-shelters a good light is necessary for winter evenings. Here, too, electric lighting is best, although acetylene is sometimes used for cheapness' sake.

Absence of Dust Traps.—To prevent accumulation of dust and to facilitate cleansing, re-entering angles and projecting ledges should be entirely avoided in a sanatorium. Corners should be rounded, walls, floors and ceilings all made with a washable surface, and all unnecessary carpets, curtains and the like dispensed with. The angles next the floors are best made of hard wood, projecting 6 or 8 inches up the wall, curved with a radius of $2\frac{1}{4}$ inches. A cheaper method is to make the curve in cement or plaster. The angle next the ceiling should be made in cement curved with a radius of 3 inches.

Floors may be made of narrow waxed boards, preferably of teak, grooved and tongued; or in bathrooms and corridors, of cement or artificial stone (such as terrano, papyrolith or terrazzo) or tiled.

Terrano, papyrolith, and torgament are composed of a mixture of wood fibre with a kind of cement, and are therefore warmer than ordinary cement or stone, while they are smooth, non-absorbent and free from cracks. Terrano is moulded in a plastic condition and sets hard and polished like stone. All these materials make a somewhat noisy floor, so that it may be necessary to use strips of carpet, or insist on the wearing of felt slippers. Solid rubber floors are too expensive to be generally applicable. If linoleum is used, it should be, as far as possible, in one piece, with the edges protected by a fillet as at Mundesley. It is apt to cause dry rot if glued down. Cork carpet is less noisy than linoleum, but is porous and soon becomes shabby unless it is well beeswaxed. Boarded floors should be polished with Ronuk or some similar material. Varnished floors soon become shabby.

Walls may be lime- or colour-washed, or panelled with wood and varnished, oiled or painted; or covered with Lincrusta or washable

paper. If Lincrusta is used, it should be of simple pattern. Panelled walls are apt to crack, and must be frequently revarnished, which is unpleasant to some people. Cracks may be filled in with a mixture of paper pulp and gum arabic, applied hot. Ordinary paper is used as a wall cover in some sanatoria, and renewed whenever a patient leaves. On the Continent washable paper is largely used (e.g. Salubra). It is better, however, to use a washable distemper (such as Duresco or Hall's or Paripan), or to have well-painted cement walls.

Solid walls with an impermeable surface are often covered with condensed moisture in damp weather, if the windows are left open. This can only be prevented by raising the temperature to an undesirable extent; but it is less noticeable with wooden walls. The ceilings should also be washable, or else be frequently white-washed; and must be free from mouldings. The staircases should have rounded angles. Pinewood Sanatorium has staircases of hard wood without risers; so that the dust falls through on to the ground. This, however, is an unnecessary waste of space. As polished stairs are slippery, a strip of hard wood, rubber or metal should be placed near the edge of each step, with horizontal shallow grooves ending gradually a few inches from either side. There should be no skirting board on the free side of the staircase. The stairs may be made with solid steps, as at the Brompton Hospital Sanatorium.

Materials.—Any of the ordinary building materials may be used for a sanatorium, provided that the interior can be made washable and kept free from dust. Where building regulations permit, wooden buildings are medically satisfactory, and are sooner fit for use than those of brick or stone. To prevent the risk of fire, a wooden framework may be covered inside and out with Kentish slabs, or uralite (an asbestos material), or with thin slabs of artificial stone, or with fire-proof paint. The Benenden Sanatorium has been built with frazzo, a kind of terra-cotta in hollow pieces which can be quickly built up on iron rods. It need not be saturated with water during construction, like brickwork, and when introduced was considerably cheaper. The spaces may be left empty or filled with cement or silicate wool. The Kelling Sanatorium is built of Mack

slabs, with a plastic solid setting floor. These slabs also are hollow, and are less expensive than brickwork. They can be used for walls, ceilings and floors.

Ducker chalets are much used on the Continent. They are made of wood covered with linen-backed paper, coated with oil paint. The windows are threefold, the floors a wooden framework which may be covered with linoleum. Windows are put in the peak of the roof, and ventilators round the stove-pipe.

Chalets may also be made of Willesden paper, which is made of several thicknesses, and is waterproof. Corrugated iron is noisy in wet weather, hot in summer, cold in winter, and only to be recommended for its cheapness and its fire-proof qualities.

For roofs of chalets, one of the best materials is good roofing felt. It should be laid on boards without ridges, and fastened down with vertical slats of wood at the joins, no nail-holes being left exposed. Uralite makes good roofing. Being very light, only a slender framework is required to support it. Willesden paper and Willesden canvas are also used for roofs. The disadvantage of ordinary canvas is that wherever a solid beam touches it, the rain tends to enter.

In building with soft materials, the possible inroads of mice should be borne in mind.

The *furniture* of the sanatorium should be light and free from unnecessary ornamentation or dead space; the heavier articles readily movable for cleaning purposes and capable of being cleaned all over, as well as the floor on which they stand. If stuffed furniture is used, the stuffings should be removable, or else kept covered with washable covers. Leather-covered lounge chairs without buttons would, however, be unobjectionable; but saddlebag or velvet covering is unsuitable. Bentwood cane chairs are good. For the open verandahs and summer-houses the most convenient couches are adjustable cane or iron ones, which may be convertible into chairs by removal of the foot-piece. There is no reason why they should not be provided with comfortable cushions, provided these have washable covers. Tuberculosis is not like scarlatina in its infectious properties. It has been suggested that the furniture should be capable of being "stoved" *en masse*; but this would

necessitate a very expensive method of construction, or a great lack of comfort, and seems quite unnecessary. Tables may be covered with American cloth fastened by fillets of wood underneath. Carpets, mats, curtains and other hangings should be only sparingly used. The carpets should be in movable strips, with a free margin of floor around the room. Hairy mats and long-pile carpets are not advisable. Skins are also best avoided, as they are not easy to disinfect without damage. Screens and hangings need not, however, be entirely banished, as they are useful in preventing draught and noise, and if of washable materials are otherwise unobjectionable. Screens must be heavy enough to stand a puff of wind, or else fixed in some way.

Plain iron bedsteads are the best kind for a sanatorium. The most comfortable are those with spiral springs; these do not sag. Mattresses, bolsters and pillows should have double washable covers. At Sülzhayn the horse-hair in mattresses is mixed with one-third sissal fibre, which is springy and clean, and considerably cheaper than horse-hair. The pedestals are often made of open japanned ironwork with a glass top, which is better than the usual wooden kind. As it is undesirable to have bags and boxes in the bedrooms, cupboards or wardrobes of some kind are necessary. In some sanatoria these are placed outside in the corridors. Cupboards encroach less upon the cubic space of the room than wardrobes.¹ Their floors should not be sunk below the floor of the room, and the interior should be made as carefully as that of the room itself. The chief objection to their presence is that they may escape the daily cleaning which is so important for every part of the room. Boots and shoes (beyond those actually in use) and outdoor clothing are best kept in a special well-ventilated and warmed cloakroom. For washstands, a choice may be made from several of the ordinary types of marble-topped or japanned iron ones.² In many of the sanatoria for the artisan classes personal ablutions are done in separate lavatories or bathrooms. Elaborate picture-frames and intricate ornaments are unsuitable for a sanatorium; but the simpler kinds may quite safely be admitted under good management, although they add to the work of the establishment.

¹ See Crooksbury Sanatorium, p. 232.

² *Ibid.*

CHAPTER VII.

SANATORIA FOR SPECIAL CLASSES.

SANATORIA differ greatly in completeness and in efficiency. There are some which are merely places where the tuberculous may live with open windows and a minimum of medical supervision; others in which the daily routine is systematically regulated according to temperature and other clinical indications. Apart from this, sanatoria differ in luxury and comfort; although the medical efficiency does not always go hand in hand with the comfort. It has been found necessary to reduce the running cost in various ways for patients of the poorer classes. Children require somewhat different arrangements; so do patients with surgical tuberculosis; and sanatoria which rigidly reject all but ambulant cases do not require quite the same arrangements as those which also receive the febrile or bed-ridden.

SANATORIA FOR THE POORER CLASSES.

Pulmonary tuberculosis is pre-eminently a disease of the less wealthy classes. Most people are infected; but it is predominantly the poor who suffer from the infection.

Many sanatoria for the "working classes" have been made unnecessarily palatial. Not only does this add to the expense of maintenance, but it prevents the sanatorium from being as useful educationally as it should be. A patient returning home to much humbler quarters may think it impossible to live the same life there as in the palatial sanatorium; which should not be the case.

Sanatoria in England have been erected for the poor at a cost of £500 to £800 per bed. Equally efficient ones have been built elsewhere for less than £100 per bed. Such differences are scandalous. Economies may be effected by providing dormitories

instead of single bedrooms ; by less luxurious fittings and surroundings ; cheaper utensils ; labour-saving contrivances ; less attendance ; unpaid labour ; cheaper food ; by the selection of less exacting cases ; and, above all, by treating a number of patients in the same institution. Economies effected by reducing the amount of medical supervision or of its remuneration, usually defeat themselves : the most efficient treatment is necessarily the cheapest in the long run.

As regards construction, sanatoria for the working classes usually have a large proportion of wards with more than one bed, and common lavatories are substituted for separate bedroom washstands. Instead of a wardrobe or chest of drawers, each patient usually has his own compartment of a large movable cupboard, for clothes and other small articles. This should have no back, and may be placed in the corridor. The top should be sloping, and not too high to be easily seen and kept clean. Boxes are usually kept in a box-room ; outdoor clothes in a cloak-room, and boots not actually in use in a boot-room. To reduce labour, curtains, carpets, and elaborate furniture are not used. Enamelled iron cups and common forks and spoons are substituted for china, glass, and silver utensils. Scrupulous cleanliness, efficient ventilation and nourishing food in abundance are as much needed in the artisan's as in the middle class sanatorium ; but bed-tables, hot bottles, specially comfortable chairs, well-kept flower gardens, and sites commanding beautiful views, are luxuries rather than necessities. The more expensive kinds of food can be replaced by cheaper articles of equal food value ; and if this increases the likeness to the accustomed home diet, so much the better, provided the dietary be suitable. Some of the attendance may be dispensed with, and some of the routine domestic work may be done by patients themselves. This, however, raises medical questions, and is treated more fully elsewhere.

By the rejection of difficult cases, considerable economies may be effected ; but if this is done, other homes or refuges for the rejected cases will have to be provided in the public interest, so that the economy is more apparent than real. Probably every patient kept continuously in bed costs nearly twice as much as one who can be up and help himself. The one may require nearly

everything done for him ; the other only needs medical advice and supervision, in addition to food and quarters.

Separation of the Sexes is usual in sanatoria for the poorer classes. It reduces the cost of administration, and removes a potent source of excitement from those with unstable temperatures.

Class Distinctions.—The recent Insurance Act makes it necessary to provide sanatorium accommodation at a cheap rate for patients of different social standing. In spite of Colonial and American experience to the contrary, it will probably be found advisable to separate those of different social classes. A clerk and an artisan may be equally poor ; but the one would not usually find the other a congenial companion.

SANATORIA FOR SURGICAL TUBERCULOSIS AND FOR CHILDREN.

Tuberculosis in children is much more often non-pulmonary than in adults, so that it is convenient to consider the arrangements for children together with those for tuberculosis of the bones, joints, glands and abdomen.

Children require more supervision and help, less isolation, systematic teaching and entertainment, and in many cases the means for efficient surgical treatment. They require plenty of warm clothing, since they have a larger body surface radiating heat in proportion to body weight than adults ; but if properly protected they thrive under open-air conditions, even from an early age. A tiny baby may be put out of doors in winter time with advantage, provided it be suitably covered and sheltered, and in very cold weather supplied with a rubber hot bottle.

Wards with a large number of beds are more convenient for the treatment of tuberculous children than single-bedded rooms. There should be large balconies and verandahs on to which the cots can be wheeled.

The nurse's room should command a view of every part of the ward through a suitable window or otherwise.

A few rooms with one or two beds each will be convenient for cases recently operated upon, or otherwise needing quiet. There should be a complete operating room with accessories, within easy reach of each ward.

Systematic instruction suited to the ages of the children is essential in a children's sanatorium. The school hours should be short, and spent out of doors. The form of instruction may have to be modified on account of physical disabilities. It should include a large proportion of nature study.

A relatively large staff of nurses is required for a children's sanatorium.

In the treatment of surgical tuberculosis the seaside is not contra-indicated, as in most cases of pulmonary tubercle. Some of our bracing seaside resorts have won a reputation for tubercle of the bones and joints, and a marine climate generally appears to suit these cases.

CHAPTER VIII.

SIZE, STAFF AND MANAGEMENT.

SANATORIA for the tuberculous are of all sizes, from those with a dozen or fewer beds, to those with several hundreds. In a small sanatorium it is easier to give individual attention to each patient, and the home-like atmosphere is more easily provided ; but financially a small establishment is at a great disadvantage. The cost of installation and of complete equipment are proportionally much heavier in a small than in a large place ; some of the arrangements for the common convenience—such as cold storage, X-ray apparatus, entertainments—can only be supplied at a prohibitive cost in a small sanatorium ; and even the cost of food per head is heavier. Moreover, it is impossible to give as large salaries to the responsible heads as in a sanatorium with many beds. For this reason, provided that competent heads can be found, there are many advantages in a large sanatorium, although any slackness in supervision, or any incompetence on the part of those in charge, is more seriously felt than in a smaller place.

Medical Staff.—The number of patients which can be properly supervised by each medical officer depends largely upon their condition. Not more than thirty or forty patients should be allotted to each doctor if they are mainly febrile or complicated cases ; but double this number of ambulant uncomplicated cases could quite well be managed. Since one medical officer at least must always be in the sanatorium, every such institution should have not less than two medical officers, otherwise the strain of the work becomes very irksome. If the medical supervision is combined with private practice or other responsible work, the sanatorium is very likely to be neglected ; so that such a part-time appointment is seldom if ever successful or satisfactory. It is only feasible if there are two or more medical officers, at least one of whom is resident.

Every large sanatorium requires a competent *pathologist*, to attend to the microscopical and bacteriological work, which will include the preparation of vaccines and of doses of tuberculin. If there is an *X-ray* department a *specialist* may be required for it.

Visiting Staff.—The system, common in hospitals, of resting the chief medical responsibility on the shoulders of a visiting staff, and merely expecting the resident medical officers to carry out their instructions, is unsuitable in a sanatorium. A consulting staff may be extremely valuable; but the man on the spot, not the man at a distance (however able) should be responsible, and should have a free hand.

Nursing Staff.—Following the precedent of the hospitals, a matron is commonly put in charge of the nurses and the servants. Occasionally the medical officer is subordinated to the matron, nominally or in practice. This is a grave mistake: the chief medical officer should have as complete control of the sanatorium as the captain of a ship. I am very doubtful whether it is ever wise to place a matron in charge of both the nursing and the housekeeping departments. An exceptionally gifted woman who has had a housekeeper's as well as a nurse's training might successfully fill such a post; but such women are rare, and it is usually better to have a separate housekeeper co-ordinate with the matron or head sister. A nurse's training is a bad preparation for domestic work.

The number of nurses required will depend on the nature of the cases admitted, and on the extent to which duties are relegated to servants.

In a *full-price sanatorium* much more has to be done for the patients than in one for the working classes—rugs to be fetched, cushions adjusted, hot bottles filled, help given in ablutions, temperatures recorded, sputum cups and flasks attended to, and when necessary rooms and articles disinfected, and medicines and other remedies administered. In addition to this, the bed-making and the wet-dusting of all but the floors are often attended to by the nurses. Some private patients are very exacting, and expect of the nurses all the services performed by a lady's-maid as well as those of an ordinary nurse. Patients in bed will require their meals brought to them, and attendance for daily functions, both of which are usually

seen to by the nurses. If the bed-making, wet-dusting, carrying of trays, and emptying of commodes, etc., are done by servants, strict supervision will be necessary. Some of these duties will not be needed for ambulant patients. On the other hand, those who have high fever or serious complications will require much more nursing, and may require to have everything done for them. An allowance in such a sanatorium of one nurse to every fifteen ambulant patients, and one to every four bed-patients, with extra help for those requiring complete immobilization, will be about right. There should also be one (or better two) night nurses for the whole building if it is large. In a small sanatorium it is sufficient if the bells ring in the staff nurses' bedroom, and no night nurse is provided, beyond special nurses when required.

In a *low-price sanatorium* there is no fetching and carrying by the nurses, patients are often expected to make their own beds, wash and polish the floors, clean the furniture and brasses, wash up plates and dishes and utensils after meals, and do other kinds of domestic work; while ablutions are entirely relegated to the common lavatories. In one German sanatorium the patients also take it in turn to attend to the sputum cups and flasks, and an overman is appointed from among them in each building to see that all duties are properly performed and rules observed. The time of the nurse may also be economized by patients bringing their thermometers to her after temperatures are taken. In this case patients must be carefully drilled in the art of taking temperatures. In many sanatoria they record their own temperatures and keep the charts by the bedside. This cannot be recommended. It is much easier to make satisfactory nursing arrangements where the clinical material is fairly uniform, so that patients should be carefully classified and drafted off to the appropriate quarters. In many low-price sanatoria difficult cases are not admitted.

For these various reasons, a much smaller allowance of nurses will suffice in a low-price sanatorium. Patients who must be kept at rest in bed will require the same attention as in a full-price institution; but the meals can be brought to them by the wardmaids instead of the nurses. Probably one nurse to every six bed patients will be enough in this case. Ambulant patients only require one

day nurse in each building, or in large buildings one to every floor, say one to every thirty or forty patients. For night duty, one to every dozen febrile patients would usually be enough, excluding severe cases as before. In a large sanatorium there should be two night nurses to each building or group of chalets occupied by ambulant patients. If the beds are conveniently grouped, there need only be two night nurses for the whole ambulant section of the sanatorium. Allowance must also be made for off-duty times. If both sexes are admitted, a larger staff of nurses is necessary.

Nurses require sanatorium training before they are of much use in sanatorium work. A fully trained nurse with no such experience is usually of less use than one of smaller training who is used to the work. Hospital routine is quite different, and in some respects is not a good preparation for sanatorium work.

Marcus Paterson¹ recommends placing the disposal of the sputa in the hands of a sputum porter; but every ambulant patient in a working class sanatorium should be taught to do this important duty himself; and a nurse could quite well supervise this.

Domestic Staff.—Every sanatorium will require a cook, kitchen-maid, and one or two scullery-maids. With labour-saving contrivances, and washing up after meals done by the patients this is enough for a low-price sanatorium of 100 to 150 beds. In full-price institutions more will be required for the washing up, and one parlour-maid to every seven patients for waiting at table, the medical officer serving. In a low-price sanatorium the waiting is done by patients in turn, and one or two maids for the nurses' and medical quarters, one or two for the servants' quarters and dining-rooms, and three or four ward-maids will be enough for a sanatorium of 100 beds. The ward-maids will scrub the floors when there are no patients able to do this, and will carry the meals to those kept at rest in bed.

In addition to the housekeeper and servants, a store-keeper is necessary in every large sanatorium, to keep the stock and give notice of requirements.

Repairing Staff.—As most sanatoria are some distance from a large town, they find it necessary to keep their own repairing staff.

¹ "Auto-inoculation in Pulmonary Tuberculosis."

If patients do some of the work under supervision, a carpenter who is something of a handyman, and a painter will be enough for most current repairs, supplemented from time to time by extra help. The electric-light engineer will usually be able to do the metal repairs. Marcus Paterson¹ recommends having a tool-keeper who will see that tools are always available, and do small repairs to them.

Laundry Staff.—Paterson² states that a laundress with three maids and one man will manage the laundry for 150 patients and fifty staff. At Hohenhonnef one man alone did the whole work.

Engine-room Staff.—For electric lighting, an engineer, assistant engineer and stoker will probably be required.

Garden and Furnaces.—If patients help in the gardening-work two gardeners can manage a large place. If there is any glass, one man cannot manage alone with only unskilled help. To look after the furnaces another man is needed, who can also act as night watchman, if the stoker sees to the furnaces in the day-time. If earth closets are used, another man will be required to attend to them. He should be under the gardener.

Business Staff.—In foreign sanatoria it is common to have a lay manager who countersigns orders for stores, advises as to contracts, sees to urgent repairs, supervises the accounts, and overlooks the male staff. He should be subordinated to the medical officer, with an appeal to the committee.

In one of the best and oldest American sanatoria, all business is in the hands of the lady superintendent and of a non-resident committee of ladies.

¹ *Loc. cit.*

² *Ibid.*

SECTION IV.—THE TREATMENT AND RESULTS.

CHAPTER IX.

THE FRESH-AIR TREATMENT.

AN open-air life is the key-note of sanatorium treatment. The patient, instead of being kept in a carefully warmed room, ventilated from other parts of the house, according to the popular notions of old, lives in the open air day and night, at all seasons and in all weather. Lack of fresh air is an important cause of consumption; fresh air is one of the most potent means of arresting it.

Now this prescription may be more pleasant to carry out in dry climates such as those of Egypt, the Alpine health resorts, South Africa or Colorado; but it is really just as easily applied in a relatively damp or rainy one such as ours or that of Germany. The credit of showing how this may be accomplished belongs mainly to Brehmer, Dettweiler and their followers, although their teaching was to some extent anticipated by George Bodington in 1840, and some others. The open-air method may perfectly well be carried out in any climate which is healthy for those who are not consumptive. As Léon Petit observes: "Here the climate may help the cure, . . . there it may hinder it; but it only exerts a secondary influence on the treatment".¹ Moreover, just as the pleasantest climates are not always those which are best for healthy people,² so it may be that the most pleasant climates for an out-of-door life—where the air is warm and dry, and little rain falls—are not the best for those who have fallen ill in this country and later on have to return to it. Bracing climates rather than warm and equable

¹ *Loc. cit.*, p. 49.

² Hermann Weber and Michael G. Foster, article in "Allbutt's Syst. of Med.," on "Climate in the Treatment of Disease".

ones have the greatest influence in restoring the tuberculous to health, in all but exceptional cases.

For the open-air treatment, a fourfold shelter should be provided against wind, excessive cold, extreme sun heat, and heavy rain. Wind raises dust, increases cough and dyspnoea if the lungs are affected, and intensifies the chilling effects of cold. The foreign sanatoria with few exceptions have both natural and artificial shelter against wind. Cold within certain limits is useful to the weak-chested; but it should be a windless cold, and suited to the individual power of reaction. As damp intensifies the climatic effect of both heat and cold, the chilly consumptive will be able to withstand a lower temperature in a dry than in a humid climate. Patients who begin their open-air treatment in winter sometimes need a short period of acclimatization, during which the time and extent of exposure are gradually increased; though it is surprising how soon even delicate ones prefer an open-air life to that in a warm room. They should be encouraged to stay out of doors all day; even the best ventilated room is inferior to the atmosphere of a garden.

The writer has known no instance in which evening air has done harm. Artificial light should therefore be provided in the shelters and verandahs, so that patients may sit out after dark and read their books and papers.

At Falkenstein patients were able to stay out of doors even during thick fog, during snowstorms, and when the temperature was 10° or 12° C. below freezing. As many as 40 per cent were able to stay out seven hours or more; and 6 per cent could stay out ten or eleven hours a day.¹ Blumenfeld, at the same sanatorium, made an elaborate investigation of the number of patients confined to their bedrooms under various meteorological conditions, and could find no noticeable difference, except during the prevalence of north-east winds.²

A patient who is properly wrapped up with his feet off the ground does not usually feel cold in winter, provided that he is

¹ P. Dettweiler, "Die Behandlung der Lungenschwindsucht in geschlossenen Heilanstalten." Second edition. Berlin, 1884.

² F. Blumenfeld, "Ueber den Einfluss meteorologischer Vorgänge auf den Verlauf der bacillären Lungenschwindsucht".

screened from strong wind. Recumbency helps the circulation ; according to Weicker and Jacoby it also favours the flow of blood to the apices of the lungs. In full-price sanatoria hot bottles are provided for the resting patients in cold weather, who occupy large sheltered verandahs. Whenever it is possible, however, the resting chairs should be placed at a little distance from the house, on a lawn or amongst the trees and flowers, where the air circulates more freely. Even in wet weather a delicate or febrile patient may remain out with advantage, provided that he keeps warm. With an umbrella and a thick rug most of our rainy days may be defied. In sanatoria modelled upon that of Nordrach it is not considered necessary to change wet clothes on entering the house. So long as the undergarments remain dry and the patient keeps warm, no harm will be done. Even if drenched to the skin, it will be sufficient to cover oneself with a thick rug. In this way the wet clothes are the equivalent of a wet pack ; and drying slowly will not harm the patient. Still, those with feeble reactive powers would do wisely to change their wet garments on coming in, with the least possible exertion.

Excepting in the more exposed situations, stormy weather preventing out-door exercise is very rare in the South of England. When it does happen, a long open covered corridor is useful. Absurd statements have been published as to the "cruelty" of open-air treatment. These have no foundation in fact. In British sanatoria it is the staff rather than the patients who suffer in cold weather.

In places where the sun's rays are very powerful, direct exposure to the sun is found to increase the tendency to fever. Even at Hohenhonnef on the Rhine, which is not far south, there is a large verandah which can be artificially cooled in hot weather by a stream of water. In our own climate in summer, warm corners where the air does not freely circulate are bad for the tuberculous, diminishing the appetite and increasing the fever. A south verandah should therefore be avoided in summer during the heat of the day.

In many German sanatoria *hydrotherapy* is freely employed, so as to accustom the patient's skin to withstand changes of temperature ; and there is usually a well-equipped douche room. Hot

baths are discouraged, and ordinary cold baths but little used. At Nordrach there was a douche in nearly every patient's room, and the afebrile ones were allowed to douche themselves freely with water of any comfortable temperature, but forbidden to dry themselves actively. The practice in British sanatoria (with some exceptions) is to disregard hydrotherapy, but to provide baths more freely. Feeble or feverish patients are often instructed not to dry themselves actively, because the exertion involved may cause undesirable auto-inoculations. It is quite safe only to mop the body slightly after a bath; and to get into bed wrapped in a bath-towel without further drying.

The *clothing* of tuberculous patients should be no thicker than is necessary to keep them warm. More than this relaxes the skin, and increases the tendency both to profuse perspiration and to catching cold. The clothing should be evenly distributed, and not too heavy. It should not hamper the movements of the chest. Woollen garments are usually recommended next the skin, mainly because they absorb a large amount of moisture, and dry slowly. Dr. Walther, however, preferred a less irritating material for under-clothing; and there is something to be said for his contention. Waterproof garments and goloshes are not to be recommended, as they hinder evaporation. In many sanatoria the use of corsets is prohibited. Garments which hinder chest expansion or press on the abdominal organs are mischievous. Hats are not found to be necessary as a rule. They are more needed indoors than out: and in the same way, overcoats should rather be put on while resting than when the patient is taking exercise.

CHAPTER X.

GRADUATED REST FOR THE FEBRILE.

IF the fresh-air treatment merely consisted in letting every patient rest in the open air, or follow his own inclinations as to the amount of exercise, it would be an exceedingly simple matter, scarcely requiring medical supervision. But the essence of sanatorium methods is the elimination of haphazard treatment and the prescription of absolute repose or of various degrees of exercise according to definite medical indications.

It has long been known that exertion increases tuberculous fever, that loss in weight is more easily made good when the patient is at rest, and that muscles made flabby by long illness may be restored by graduated exercise; but the reasons for graduated rest and exercise in pulmonary tuberculosis were not accurately known until Sir Almroth Wright cleared up the matter by his experiments on the opsonic index. Brehmer's original explanation—that the heart is too small in phthisical subjects, and may be enlarged and strengthened by graduated hill climbing in an immune climate is no longer accepted, and the value of his methods is otherwise explained.

In every acute infectious disease the absorption of microbic toxins gives rise to immunizing processes which may destroy the invaders, or at least neutralize their ill-effects. Spontaneous recovery usually happens after infection with the tubercle bacillus; it does not take place in some acute forms because the dose of toxine absorbed is too great or too virulent for the immunizing machinery, and in some chronic forms because too little toxine is absorbed or the machinery has become sluggish.

In such cases, the tubercle bacillus has blocked the blood-vessels of the affected parts, and surrounded itself by a mask of fibrous

tissue, under cover of which continuous destruction of tissues may take place.

The chief object of modern sanatorium treatment is to reduce the absorption of toxins when it is too great, and to increase it when the immunizing centres are insufficiently stimulated.

Febrile tuberculous patients have therefore to be kept rigidly at rest, all unnecessary exertion—such as that from coughing, ablutions, straining at stool, or sitting up in bed—being as far as possible avoided. Latham has shown that by such rigid rest as is usual in typhoid fever, high temperatures may be enormously reduced in many cases of pulmonary tuberculosis. In other cases a less rigid rest will suffice.

Later on, exercise is needful, according to an ascending scale, beginning with sitting up for a few hours on a lounge chair, then short walks of a few yards on level ground, leading on to longer walks, hill-climbing, and other forms of more active exercise.

THE HIGHLY FEBRILE.

The tuberculous patient with high fever must be spared all unnecessary exertion. He must be prevented from fidgeting in bed, from raising himself into a sitting position, from all unnecessary talking; he must be washed piecemeal by a nurse, and no more than is actually necessary; the usual precautions being taken against bedsores. Hair brushing must be done for him; by the use of an antiseptic mouth-wash some otherwise necessary tooth brushing may be avoided. He should relieve himself without sitting up, and all straining should be avoided. Medicinal treatment for constipation or diarrhoea will help in this respect. Every mouthful of food should be given him by a nurse, drink being given with a feeding cup.

Hydrotherapy is much employed on the Continent to reduce fever; but I have not yet had a patient who did not complain of fatigue after one or two packs, and beg to have them stopped. Tepid sponging of limbs and trunk is less trying, and may do good for a short time. If there is profuse perspiration, the patient should have the skin washed and dried; and the bedclothes should be

reduced to as little as will keep him from feeling cold. Very often this will be no more than a sheet or a single blanket.

Cool air is a better remedy than cool water for long-continued fever. The bed should be brought out into the open air under an awning for as much of the twenty-four hours as possible. But for the extra trouble involved to the nurses, a sleeping shelter is better than a bedroom. Curtains may be necessary for the sake of privacy. In very hot weather the naked skin may quite safely be exposed to the air, so long as it feels pleasant to the patient. Pushed to an uncomfortable extent, however, it may increase congestion in the lungs and do harm.

Mental repose is of great importance in tuberculous fever, so that as few visitors as possible should be permitted; and the bed should be placed in a quiet airy spot screened from direct sunshine.

Cough must be restrained by suitable drugs or inhalations. Sometimes it may be diminished by strapping or bandaging the chest. In obstinate cases Forlanini's operation may be of service.

Treatment by drugs and vaccines is discussed in chapters xv. and xvi.

SLIGHTLY FEBRILE CASES.

In these cases the treatment need not be so rigid. The patient may be allowed to wash himself, to use the commode, or perhaps visit the W.C., and to use his hands for anything which does not involve perceptible exertion.

Visits of friends and relatives should be discouraged, excepting so far as they prevent moping. There is some reason to believe that the visits of husband or wife are more disturbing than of those less intimately connected; but there is also a great difference between one visitor and another: some are judicious and not exciting, others lack this quality.

At Reiboldsgrün Sanatorium exciting books are marked with a star and forbidden to the febrile. All mental activity necessarily involves expenditure of energy, which is needed for the repair of damaged lung tissue and the restoration of constitutional strength. Those who are familiar with the Weir-Mitchell treatment will know the importance of economizing strength in feeble patients by the

avoidance of emotion and of active exertion. All business, especially of a worrying nature, and all excitement, should therefore be avoided until fever is over and convalescence assured. In the earlier stages of treatment rest is far more important than exercise; and this should include mental as well as physical repose.

OBSTINATE FEVER

is often due to mixed infection, so that if the fever does not subside within the first month, further measures should be adopted. Indeed, it is open to discussion whether some form of vaccine—tuberculin or other—should not be given in every case of marked fever after a still shorter interval. Fever is a sign of imperfect immunization. When more antibodies are formed, the necessity of increasing the circulation to the fever point disappears, and with it the fever. Examination of the sputum, and of the temperature chart, will help the physician in the choice of a remedy. If the sputum contains tubercle bacilli, but no other recognizable pathogenic organism, the proper course is to use an unirritating form of tuberculin. If, on the other hand, there are other pathogenic organisms, a vaccine of the same kind may first be administered. In case of doubt as to which of several bacteria is the offender, the opsonic index may be useful. If the second infection consists of the pneumococcus, creosote in some form may be given with advantage, especially if the expectoration be abundant.

In some cases of obstinate but moderate fever, intermittent auto-inoculations may be tried, the patient being allowed to get up and rest on his lounge chair for a couple of hours every third or fourth day, gradually increasing the exertion, but insisting on strict rest on intervening days.

Treatment by continuous inhalation is probably chiefly of use in mixed infection.

A relapsing type of fever is not uncommon in tuberculous patients, the fever ebbing and flowing with a long wave lasting from ten to forty days. Sometimes these waves correspond with the menstrual period, and the maximum is found either just before or soon after the catamenial flow. In other cases there are other causes at work—possibly a fresh outbreak of tubercle. A case of tuberculous

peritonitis under the writer's care showed such a wave. These relapsing cases are usually obstinate, and do badly. It is probably good policy to enforce strict rest when the fever is highest and to allow a little exercise at the minimum period if the fever is then very slight. Long-continued strict rest cannot be depended upon to subdue this form of fever.

FEVER FROM OTHER CAUSES.

Digestive disturbance may cause fever at times ; but the attack is usually slight and fleeting. In these cases a more liberal allowance of exercise is advisable. Nervous excitement may give rise to high fever in tuberculous patients. Here the temperature rises rapidly and subsides almost equally quickly. The nerve centres are abnormally sensitive in the tuberculous, owing to the circulation of toxines, and considerable disturbance may result from slight causes. Mental rest should be combined with a little occupation involving the least possible exertion.

The possibility of intercurrent complications—such as meningitis, fistula or pleurisy—should also be borne in mind.

CHAPTER XI.

REST AND EXERCISE FOR THE AFEBRILE.

ALTHOUGH the subjects of afebrile pulmonary tubercle require progressively more exercise than the febrile, they are usually all expected in a sanatorium to rest for an hour before the chief meals, since food is better digested if the patient is not tired.

The object of graduated exercise is partly to improve the muscular condition and the general health, partly also to cause auto-inoculations for the sake of the subsequent reaction and formation of antibodies. In the early stages of graduated exercise we try to cause as great an auto-inoculation as the body can respond to efficiently. The optimum amount for this purpose may be much less than the patient is muscularly capable of doing.

Later on, when auto-inoculation ceases, the sole object is to harden the muscles and improve the general health.

Graduated exercise may consist of walking, hill-climbing, respiratory exercises, games, graduated work, and gymnastics.

Walking exercise on level ground concerns chiefly the muscles of the legs and those connecting them with the trunk. It is usual to limit the pace so as to avoid breathlessness, generally to about two and a half miles an hour. Just as in emptying a theatre, more than a certain pace causes a block at the doors, so in excessive exertion some venous congestion is caused in the lungs; and the smaller the area of healthy lung the slower the pace necessary to avoid this. If the mouth must be opened to breathe with comfort, the pace is probably excessive. In walking the head should be held erect and the chest expanded. There should be no talking during exercise if this causes any shortness of breath, or undue elevation of pulse rate and temperature. In some cases solitary walks may be necessary.

Hill-climbing was the form of exercise originally recommended

by Brehmer. Besides being harder work, it rhythmically compresses the liver and other abdominal organs, and indirectly leads to chest-expansion.

Although at many sanatoria walking along level ground precedes hill-climbing, at others the latter is attempted quite early; and provided the pace be slow and there be many pauses, it usually does good rather than harm if the patient is fit for exercise at all. It should not be attempted if there is marked dyspnœa or great weakness, or if the pulse rate remains high afterwards. The gradient should not usually be more than 1 in 10 or 12.

Respiratory exercises are intended to expand the still healthy parts of the lungs, and to improve the circulation through them. So long as there is any inflammation or active spreading of tuberculous disease, rest is indicated rather than exercise. Premature movement of inflamed parts probably increases the formation of cicatricial tissue,¹ or helps destructive changes, according to the intensity of the disease. When, however, the disease is quiescent, respiratory exercises are valuable. Residence at high altitudes causes constant deep breathing, since the thinness of the air necessitates a larger supply. At lower levels, a similar effect may be produced by systematic deep breathing. Dettweiler at Falkenstein used to recommend his patients to take five or six deep breaths slowly through the nose every 100 to 150 paces while walking, or every five minutes while lying down. Another method consists in gradually increasing the length of inspiration and expiration, the time being estimated by counting slowly to oneself.

Singing has much the same effect, if the chest is kept expanded and the breathing properly managed.

Breathing exercises accompanied by movements of the arms fall into a different category, which is considered farther on.

Games are useful in promoting cheerfulness and preventing self-concentration. They are bad if they involve sudden exertion, or cause excitement. The element of emulation in games makes it necessary to watch their effect carefully. In some patients the disturbance produced is quite out of proportion to the exertion, while in others no such bad effect is noticed. Games which involve exer-

¹ E. E. Prest, "Lancet," 2 Sept., 1911.

tion should be counted as part of the day's exercise. At the Crooksbury Sanatorium they are graded in the same way as different kinds of work.

Quiet table games—dominoes, etc.—rank with sedentary work ; putting, bullboard, rope quoits, croquet with light work, golf with medium work. Cricket, tennis, football, hockey and similar games are not suitable for those convalescent from lung disease.

Gymnastics are not much in favour in British sanatoria. Simple arm exercises might be attempted after a graduated course of carrying exercises has been passed through. Ordinary gymnastics are only advisable in cases where the lung lesions are extremely slight, not recent, and not associated with any auto-inoculation.

Graduated Work.—It was long doubted whether the subjects of lung disease should do any manual work. Otto Walther forbade his patients to use their arms actively until two years after leaving the sanatorium ; and it has generally been believed that exertion of the arms hindered healing and might cause hæmorrhage. The lack of occupation, however, was found to be very hurtful to the habits and character of sanatorium patients, so that Penzoldt¹ sent some of his patients to Reiboldsgrün Sanatorium to be received free of cost, on condition that they did light work ; and since then light work has been commonly prescribed in German People's Sanatoria. Sir R. W. Philip has required his patients at the Victoria Chest Hospital in Edinburgh for many years past to do some work ; and more or less light work is expected in most of the British sanatoria for the working classes, and in some of those for the middle classes. There are, however, stronger grounds for prescribing work in chronic and early quiescent cases ; and Inman and Paterson² showed by opsonic tests and by clinical evidence that in such cases work did much good if it were carefully graduated. In the healing of tuberculous lung-lesions, a stage is often reached in which no auto-inoculation results from fairly active exercise. Here long walks are insufficient to

¹ "Behandlung der Lungentuberkulose" in "Handb. der speciellen Therapie der innern Krankheiten".

² A. C. Inman, "The Effect of Exercise on the Opsonic Index of Patients Suffering from Pulmonary Tuberculosis".

Marcus S. Paterson, "Graduated Labour in Pulmonary Tuberculosis," "Trans. Medical Society of London," Vol. XXXI, 1908.

complete the cure ; and the severer grades of hill climbing may be replaced with advantage by graduated work.

Paterson's Grades of Work.—Paterson divided the work done by patients at Frimley into five grades, the first consisting in the carrying of baskets of mould, the second in the use of a small shovel, the third in the use of a large shovel, the fourth and fifth in the use of the pickaxe, and the equivalents to these. The carrying grade is intended to prepare the muscles of the arms for more strenuous work ; and is divided into three sections. In the first section a load of 12 lb. is carried up a gradient of 1 in 10·7, a distance of 50 yards, the basket being brought back empty, and eighty journeys being completed in the four hours of work. In the second section the load is 18 lb. ; in the third 24 lb.

In grade 2 an ordinary coal scoop with a long handle is used to dig earth and raise it 7 feet into a cart : from 2 to 4 tons will be so raised in the course of four hours.

In grade 3 an ordinary shovel is used for the same purpose, the amount being about 6 tons.

In grade 4 the pickaxe is used on unbroken ground for four hours. Concrete mixing is placed in the same grade, although it is harder work, being more continuous.

In grade 5, the pickaxe is used for six hours a day. After this the patient is put to work at his own trade for three weeks before leaving.

As regards the equivalents of the above-mentioned work : painting, hoeing and chopping wood are considered to be equal to the work of grade 2 ; sawing trees into firewood, to grade 3 ; planing wood, to grade 4. Patients who have reached the stage of walking four miles a day are expected to make their beds, clean the wards and windows, polish the corridor floors, clean the dining halls and polish the brasses.

Women do the same work in part, but with lighter implements ; they also do some gardening and poultry keeping, and in the final grade scrub the floors.

The Crooksbury System.—Although the Crooksbury Sanatorium was intended for ladies and gentlemen, it was soon found desirable to include some kinds of work in the daily programme, since walking

exercise up to three or four hours a day becomes very monotonous in the same neighbourhood, however beautiful, and in quiescent stages of disease is insufficient to cause auto-inoculations or to complete the restoration of muscular tone. Some of my patients have therefore been engaged in chopping wood, cutting down trees, making paths, using the pickaxe and grubaxe, and in various kinds of garden work. More recently a graded system has been introduced, which in its latest form is as under:—

Patients in bed: six stages, beginning with absolute rest in bed, in the next permitting the use of the commode and ablutions at the bedside, in the next visits to the lavatory, in the remainder the patient being up and dressed for an increasing number of hours and meals.

Ambulant patients: three stages, walks increasing in length, sedentary work up to two hours.

Light work: three stages, from two to four hours of light work, completing the four hours if necessary with sedentary work.

Medium work: four stages, consisting in work of medium severity up to four hours, completing if necessary with light work; then two stages in which the "medium" work is increased up to six hours.

Heavy work: from one to six hours of heavy work, completing the six hours when necessary by work of medium severity.

In the above-mentioned table, *sedentary* work includes such kinds as needlework, netting, and basket making. By work of *medium* severity is meant any kind roughly equivalent to digging in already worked ground, or sawing deal wood. Carrying loads of not more than 10 kilograms (22 lb.) is included in this grade; pushing a wheelbarrow along level ground, using the roller or mowing machine (in each case two patients together), using the broom or garden fork. Scrubbing is probably equivalent to this work. By *light* work is meant any kind which is not sedentary and which involves much less exertion than work of medium severity, e.g. weeding, spudding daisies, gathering cones or sticks, scattering earth, chopping firewood, painting, raking, hoeing, or carrying loads of not more than 5 kilograms (11 lb.). *Heavy* work is any kind which involves decidedly more exertion than medium work—e.g. using the axe or

pickaxe, deep trenching, digging new ground full of roots, or wheeling a loaded wheelbarrow up hill.

Patients who complete the stages of light work are probably fit for sedentary or light ambulant work.

Those who complete the "medium" stages are fit for ordinary manual work, those completing the "heavy" stages could probably take up laborious occupations.

CHAPTER XII.

TEMPERATURES.

THERMOMETRY.

AXILLARY temperatures are of very little value as guides in open-air treatment, because the surface of the body is cooled down by the fresh air if the subject is living more or less out of doors.

To a lesser degree this is also true of mouth temperatures. Every time the mouth is opened its mucosa is cooled down by the outer air; and if a breeze be blowing on the cheeks, this cools down the mouth cavity even if the mouth be kept shut. According to Burton-Fanning:¹ "It may be necessary to keep the mouth firmly closed for half an hour to obviate the depressing effect of the inspiration of cold air on the oral temperature".

To be moderately reliable, mouth temperatures should be taken in a warm room with the mouth kept shut, and the thermometer in situ, for not less than a quarter of an hour. The use of a half-minute thermometer cannot greatly reduce the time necessary; because time is required to warm up the mouth cavity, and not merely the bulb of the thermometer. Mouth temperatures do not reveal the existence of slight degrees of fever, which are often important in the treatment of pulmonary tubercle. Moreover, the introduction of hot or cold substances into the mouth—food, medicines, etc.—alters the temperature of that cavity for some time after, so that no observation should be taken for at least half an hour afterwards. On the other hand, rectal temperatures can be accurately taken in five minutes. For this reason, in most of the reputable sanatoria the temperatures are taken per rectum. There is no constant relationship between rectal and oral temperatures. The dif-

¹ "The Open-air Treatment of Pulmonary Tuberculosis," 2nd ed., p. 32.

ference in the same patient on the same day may vary between 0.4° and 1.4° F. according to the time of day. Therefore, whenever it is important to recognize small degrees of fever, or to record the temperatures accurately, rectal thermometry should be adopted. The bulb of the thermometer should be introduced $1\frac{1}{2}$ inches inside the sphincter ani, and kept there for five minutes. Temperatures should not be taken for half an hour after action of the bowels. If there are hæmorrhoids or any inflammatory complication about the anus, it may be advisable to place the bulb of the thermometer between the thighs with legs tightly crossed.

It is recommended in some sanatoria abroad to take the temperature with the thermometer bulb in the stream of urine. This cannot be reliable unless the bladder happens to be pretty full, and unless great care is taken to keep the bulb exactly in the stream.

It may serve for a rough test, but for no other purpose.

THE DAILY RANGE IN HEALTH.

The temperature in health taken per rectum is 97.8° F. (36.5° C.) or less at the minimum, before breakfast; 99.2° F. (37.3° C.) or less at the maximum, taken after an hour's rest. Convalescents from an illness may show a wider range, unless kept at rest. It is exceedingly common to find the body temperature raised in women during some part of the menstrual cycle. Moreover, in either sex any bacterial infection may artificially raise the temperatures. The effect of a meal is to raise the temperature by about 0.6° F. (0.3° C.).

THE EFFECT OF EXERCISE

is to cause an immediate rise, which may be as much as 3° or 4° in a healthy man; but the temperature soon falls on resting. Therefore any temperature taken an hour after exercise, which exceeds 99.2° F. (37.3° C.) in a man, or 99.8° F. (37.7° C.) in a woman, should be regarded as abnormal.

Otto Walther employed the rise of temperature immediately after exercise as a guide to treatment. Owing to the rapid but unequal fall of temperature on resting, and to the time required in the mouth for an accurate measurement, temperatures taken this way

cannot be used for such a purpose; they are neither rest temperatures nor exercise temperatures.

TEMPERATURE TIMES.

In most sanatoria temperatures are taken four times a day, although some doctors are content with two or three. The earliest, which usually indicates the minimum of the waking day, is taken before breakfast—say at 7 or 7.30 a.m. The next is taken in the middle of the day, at 12 or 1, or on returning from the morning walk or work. The third time is from 5 to 7 p.m., the last from 9 to 10, or at least ten minutes after getting into bed. In a new-comer, in order to detect the existence of slight fever, it may be necessary to take the temperatures every two hours during the latter half of the day. The commonest hour for the maximum in chest disease is probably 5 p.m., although in some it may be as late as 9 p.m., in others at 7 a.m. or at noon. If temperatures are taken immediately after exercise, this should be arranged to end at the usual hour for taking temperatures—say 12 noon. Otherwise we have to take into account the change of hour as well as the amount of exercise: which is confusing. S. Vere Pearson takes rest temperatures at 7.45 a.m., 6.45 p.m. and 9.45 p.m., exercise temperatures at 12 noon. At the Crooksbury Sanatorium all four temperatures are rest temperatures, excepting twice a week, when the midday one is an exercise temperature. Lawson takes a rest temperature forty-five minutes after the exercise one. There are drawbacks to such frequent thermometry. Afebrile patients doing graduated work need only take temperatures twice a day—on rising and at 5 or 6 p.m.

INDICATIONS FOR REST.

Patients should as a rule be kept at rest in bed until their temperature has remained for a week below 98.6° F. (37° C.) at the minimum and below 99.5 for a man, 99.8 for a woman at the maximum.

If however after a couple of months there is no evidence of a progressive decline in temperature, further measures are necessary, either in the form of tuberculin or vaccine treatment or of a mild

auto-inoculation, or else a very rigid application of rest, as for high fever, or some other remedy.

In all cases it is important to take note of the general trend of the temperature. A small progressive increase or decrease gives indications as to the sufficiency of the treatment. Rigid rest in bed is advisable whenever the temperature continues over 101.3°F. (38.5°C.) at the maximum for more than a few days. Another indication for rest is a pulse rate raised above 90 in an adult. Those who are very feeble or very thin should be kept at rest.

INDICATIONS FOR REDUCED EXERCISE.

If the exercise temperature is over 100.4 the pace may have been excessive, or perhaps the time. It is a more certain indication if the next rest temperature is higher than usual; still more if subsequent temperatures are also higher. It is good practice in this case at once to reduce the exercise considerably for a few days, and then to return to the original amount or a little less. Those who rely upon mouth temperatures consider a temperature of 99°F. (37.2°C.) at any time of the day,¹ or this together with a headache,² as a sign that no exercise should be taken.

A temperature of 99° by the mouth in the after part of the day probably corresponds with a temperature per rectum of about 99.6 - 100.4°F. (37.6 - 38°C.). Personally I think that with a rectal rest temperature of 99.8°F. (37.7°C.) in an early case or of 100.4°F. (38°C.) in a chronic case walking exercise is not advisable.

¹ Burton Fanning, *loc. cit.*, p. 102.

² M. S. Paterson, *loc. cit.*, p. 138.

CHAPTER XIII.

FOOD AND NUTRITION.

THE food of tuberculous patients must conform to the ordinary rules of dietetics. It must be of a mixed character, containing representatives of the different classes of food stuffs ; it must be digestible, appetising and varied ; it must be sufficient to nourish without overloading the stomach ; and it must bear some relation to the loss of tissue and of energy resulting from exercise and other circumstances. It must also to a certain extent be suited to the national and individual tastes and customs, and be directed by the results of experience, both of the physician and the patient.

All these matters should be taken into consideration by the medical director of a sanatorium, who should settle the daily *menu* in consultation with cook or housekeeper, take his chief meals with his patients and notice how they fare, and introduce suitable modifications to suit individual requirements.

In most of the early cases without marked dyspepsia, the proportions of food stuffs advisable do not differ greatly from those required by a healthy growing lad. Since there is a tendency to loss of weight, and the need for constructive metabolism, there should be a relatively large proportion of easily digestible nitrogenous and fatty foods. Bardswell and Chapman¹ advise that those who are below standard weight should have a diet in which the proteids and the total caloric value are both increased by 30 per cent, as compared with an average adult diet. A healthy man of 10 stone doing clerk's work is considered by them to require 120 grammes of proteid, 110 grammes of fat, and 250 of carbohydrates, with a total caloric value of 2540. On heavy work such a man would require as much as 4000-5000 calories. If the proportion of fats

¹ "Diets in Tuberculosis," London, 1908.

is high the diet is less bulky than where the increase is chiefly in carbohydrates; and in tuberculosis excess of fat can be absorbed more easily as a rule than excess of carbohydrate.

Most of the ordinary articles of diet may be given to the tuberculous; although one would not give the less digestible to the dyspeptic or to those taking no exercise. Meat should form the bulk of the nitrogenous food. Beef and mutton are preferable to poultry and game. Many people seem to think that milk should form an important part of the diet of the tuberculous; and it is largely used at most sanatoria. It is, however, a bulky food compared with meat, and therefore less valuable. Weight for weight, meat contains between six and seven times the amount of protein as milk; bulk for bulk there is a still greater difference. A diet containing much milk helps the patient to gain weight quickly; but as this consists largely of adipose tissue, it is soon lost when exercise is freely taken. Ambulant patients should depend more on meat than on milk for their supply of proteids. When meat cannot be taken in sufficient amount, it may be replaced by milk; but this must then be given in large quantities at short intervals, as in early Weir-Mitchell treatment.

The most useful sources of fatty food for the tuberculous are fat bacon, ham and pork, and good butter. Cream is but a diluted form of butter.

Fruit and vegetables consist chiefly of water with a little sugar. Their chief value is to correct constipation and to supply mineral salts.

For those able to eat reasonable quantities at a meal, three good meals are better than many small ones. At Nordrach, in Germany, Walther used to forbid intermediate meals. Patent foods are more expensive than ordinary articles of diet, and should be reserved for difficult cases. They should not be given as substitutes for ordinary food, but only to supplement it if necessary.

OVERFEEDING.

It is commonly supposed that overfeeding is an essential part of open-air treatment. This is a mistake. If patients are below standard weight they should take just enough of a properly pro-

portioned diet to gain weight steadily. When they are again up to standard, stuffing is no longer desirable, and may cause gastric dilatation. Most of the subjects of lung disease have been in the habit of refusing certain wholesome articles of diet, and are dainty and capricious in their ways. It is most essential to correct any mistaken notions about food, and to teach the patients to eat freely of everything that is wholesome. Daintiness paves the way to a relapse.

Exceptional dietaries are needed for the dyspeptic, the highly febrile, the diabetic, and those who have recently had severe hæmorrhages.

It is a mistake to put the febrile tuberculous patient on a low diet: as a rule a full diet is well borne in such cases, and helps recovery. I have written more fully on dietetics for the tuberculous elsewhere.¹

BODY WEIGHT.

It is customary to weigh tuberculous patients at regular intervals, as a guide to the progress made. The same clothes and the same hour of day should be chosen; and as far as possible the same conditions observed. A considerable difference may be made by a full or an empty bladder or rectum, or by food or drink taken beforehand. Clothes may weigh as little as 16 oz. (in bed) or as much as 16 lb.: there are much greater differences between one vest and another or one suit of clothes and another than is generally suspected.

When the patient is approaching the standard for his height, age and sex, it becomes more and more difficult for him to gain weight—and less and less necessary. Rapid gain in weight is usually less permanent than slow and steady gain: one or two pounds a week are a good average. Gain in weight while the patient takes exercise is more permanent than the (perhaps) larger gain while at rest. Quite commonly a patient who begins to take exercise after some weeks' rest, will lose in bulk without losing in weight. People differ in specific gravity; some have more watery tissues than others.² Convalescents from any acute illness weigh less, bulk

¹ See "The Sanatorium Treatment of Pulmonary Tuberculosis," Baillière, Tindall & Cox, 1909.

² Jaeger, "Problems of Nature," 1897, p. 117.

for bulk, than those in a "harder" condition. The subjects of pulmonary tubercle are in this respect for a long time like convalescents.

COD-LIVER OIL

may be regarded as a food, or as a drug. While it is invaluable in treating those whose diet cannot be controlled, it is not usually necessary in a good sanatorium where the diet is sufficiently generous.

CHAPTER XIV.

PRECAUTIONS AGAINST INFECTION.

ALTHOUGH tuberculosis belongs to the infectious diseases, it is probably the easiest to prevent from spreading. Simple cleanliness alone will go a long way to prevent its extension to other people; so that many were doubtful whether it was really infectious, until Koch and others proved it to be so. At the Brompton Hospital careful inquiries, extending over a period of thirty-seven years, were made by the late Drs. Cotton and Theodore Williams as to possible infection from patients. The old building was very badly ventilated; but although the foul air from phthisical patients produced attacks of sore throat and erysipelas, it did not lead to spread of tuberculous disease amongst the healthy attendants. None of the resident medical officers, matrons, gallery maids, porters or secretaries and clerks became phthisical, although most of these were brought into frequent contact with the patients. Out of about 150 house physicians only one appeared to have contracted the disease in hospital; out of 101 nurses three died of consumption after leaving the institution, but in only one did the disease show itself while in hospital. Of twenty-two dispensers three died of phthisis, one while in the building, and two of the dispensers held office for twenty years. Similar investigations by Heron at the City of London Hospital for Diseases of the Chest also failed to prove infection among the attendants. No case has ever been reported from any modern chest hospital which takes even elementary precautions concerning the sputa. Aufrecht states that at the hospital of Magdeburg-Altstadt 34,560 patients were received during a period of seventeen and a quarter years, of whom 3820 were phthisical, mostly in an advanced stage; but none of the other patients, and none of the large nursing staff, became consumptive. Two tabetic patients and four with multiple sclerosis remained from three to eight years side by side

with consumptives, and another with adherent pericardium became intimate with his phthisical neighbour, without any becoming infected. At the meeting of the American Climatological Association, in May, 1896, Dr. V. Y. Bowditch, of Boston, said: "I wish to refute the statements that properly regulated consumptives' hospitals are a source of danger to the community, when I believe them to be exactly the opposite, as shown by statistics". This opinion will be accepted by all practical physicians; but in view of the scare which appears to be arising among certain sections of the laity the matter needs to be called attention to.

Dr. I. H. Hance, assistant to Dr. Trudeau at the Adirondack Cottage Sanitarium, proved by the inoculation of guinea-pigs that sixteen out of seventeen cottages inhabited there by consumptives for so long a period as ten years were absolutely free from infectious material. In the exceptional cottage the patient had disobeyed instructions and expectorated wherever convenient. In a further investigation Dr. Hance took dust from tenement houses containing consumptives, and inoculated guinea-pigs therewith. Where instructions had been followed no guinea-pigs suffered; while in the dirtier tenements two out of three were found infected. Of street cars one out of every five were found to be dangerous. In the two hospitals, Bellevue and Charity, no infectious dust was discovered, except in the out-patient room at Bellevue. In the Winyah Sanitarium none was found.¹

Römpler investigated the mortality from consumption from 1790 to 1889 in the village of Görbersdorf, which is close to several large sanatoria, with an aggregate of 500 to 600 beds. Before the establishment of the oldest sanatorium the deaths from this cause in the village were at the rate of 0·83 per annum; whereas since that time the rate was 0·47; and yet the population had doubled in twenty-five years, and in forty years some 25,000 consumptives had been treated in the different sanatoria.² Nahm, who made similar investigations in the village of Falkenstein, obtained corresponding results. During the twenty years preceding the establishment of

¹ "N. Y. Med. Rec.," 28 Dec., 1895.

² "Beiträge zur Lehre von der chronischen Lungenschwindsucht," Berlin, 1892. See also Knopf, *loc. cit.*

Dettweiler's institution an average of 4 per 1000 of the inhabitants died annually of pulmonary tubercle. After the sanatorium was opened the average annual mortality from this disease fell to 2·4 per 1000.¹ Dr. Römpler had had five servants for twenty-three years at his large sanatorium, and seven more than five years, out of twenty-three in his staff at the time of writing; not one of these twenty-three were consumptive, nor any whom he could trace who had been in his employ, although they necessarily came freely into contact with the patients.² The late Dr. Achtermann, for many years connected with the Brehmer Sanatorium, stated that he was for years in the habit of testing by inoculation the dust from the corridors, saloons, W.C.'s, and patients' rooms. Only once did he find evidence of the existence of tubercle bacilli, on a washing board where a spitcup had stood.³ Ransome states that sputum, which retained its virulence for several months in a poor cottage in Ancoats, entirely lost its power of communicating the disease to guinea-pigs by inoculation when freely exposed to the air and light in a consumption hospital, and in a well-lighted, well-ventilated, and well-drained house.⁴ Moreover, in another series of experiments, sputa as well as pure cultivations lost their power for evil on exposure to air and light for two days, or to bright sunshine for one hour.⁵

Even in open health resorts there is very little danger of infection excepting in crowded towns and cities, or where ordinary hygienic precautions are neglected. It is true that at the Riviera the deaths from consumption amongst the native inhabitants are said to have increased; but this is not quite certain, and is in any case capable of explanation in other ways. It is quite possible that the hotter climate may encourage the saprophytic existence of the tubercle bacillus. But the conditions of life in a densely crowded town are very different from those in a scattered village; and if the facts are correct, they point to the need of more reasonable methods of building, better ventilation, and less overcrowding, together with more

¹ "Münch. Med. Wochenschr.," 1895, No. 40.

² "Deutsche Medizinal Zeitung," 1893, No. 35.

³ Prospectus of Laubach Sanatorium.

⁴ Ransome, "The Treatment of Phthisis," London, 1896, p. 37; Ransome and Dreschfeld, "Proc. R. Soc.," xlix., 66.

⁵ Ransome, *ibid.*; Ransome and Delépine, "Proc. R. Soc.," lvi., May, 1894.

systematic precautions concerning cleanliness, disposal of the sputa, and the like. Consumptives should not live in towns, or if compelled to do so should inhabit dry and well-ventilated rooms. If they do so, and refrain from random spitting and other uncleanly ways, they will never be a serious danger to their companions. Ransome states¹ that he has never seen a case of infection in an ordinarily well-ventilated house, and gross neglect of ordinary rules would probably be needful to cause tuberculous infection in such a house. Haupt made a careful investigation at Soden, and found that there were fifty-two people between seventy and ninety years old who had lived in thirty-one different houses which they let out in summer to consumptives. Half of them also waited on the invalids, but none became phthisical. Michaelis had practised over thirty years in Bad Rehburg in 1897. This bathing resort had existed for over fifty years, and was annually visited by about 500 consumptives. There were then about 350 inhabitants in sixty-five to seventy houses; and only three consumptives were found amongst them who had been born there, while these had acquired the disease elsewhere.² Even amongst married couples, where one is phthisical it is exceptional to find the other affected. Leudet found only seven out of 112 such cases, and Haupt only 7 per cent out of 1061 married couples.³

It is perfectly certain that under ordinary hygienic conditions the danger of infection from a phthisical patient is purely imaginary. But this should not blind us to the very real danger which exists where hygienic rules are disregarded, and this is in fact a strong argument in favour of hygienic training of consumptives in a sanatorium. The danger lies not so much in the breath, as in what is coughed up. It has been calculated by Hiller that there may be as many as 300,000,000 tubercle bacilli in each expectorated morsel of 3 c.cm. Were these sputa to be allowed to dry and mingle with the dust, they would constitute a serious danger for every susceptible person who happened to inhale them. Nor does the danger stop here; for Ransome has shown that the bacilli are capable of grow-

¹ Ransome, *ibid.*, London, 1896.

² Quoted by Unterberger, "St. Pet. Med. Woch.," 1897, n. F., xiv., No. 29.

³ Unterberger, *loc. cit.*

ing in ordinary temperatures on damp wall-paper, especially in presence of organic effluvia from the breath or the soil. Fortunately, sunlight and fresh air are most efficient disinfectants; and if the sputa are received into suitable receptacles and destroyed before they dry, there can be very little danger. From recent investigations by Flügge and others it appears that in advanced stages tubercle bacilli may be scattered as much as a yard from the patient during coughing, and even (it is stated) by the effort of speaking, being floated up by little bubbles of air. Something should be held before the mouth during coughing to prevent mischief in this way.

Every male patient who expectorates freely should be clean-shaven, to avoid the risk of sputum clinging to the beard. Any rag or handkerchief used to wipe the lips should either be destroyed at once or placed in a washable pouch or receptacle, not under the pillow or in an ordinary pocket. The habit of turning leaves of books with a finger wetted in the mouth may spread infection and should be avoided. Kissing of others is better avoided by the tuberculous, especially on the lips.

Spitting.—There should be strict rules against spitting anywhere excepting into a proper receptacle. In a sanatorium repetition of this offence should entail expulsion.

The practice of spitting into a fireplace or a spittoon is full of risk, and should be avoided. The proper receptacles are either a spitcup or a spitflask, or, failing these, a piece of paper or rag which is kept in a safe place until it is destroyed.

If *handkerchiefs* are used to receive expectoration, they should not be kept long, and should be destroyed or steam cleaned after use, and only carried about in india-rubber pouches or in pockets with detachable linings. Japanese paper handkerchiefs or butter muslin may be used for this purpose, and afterwards burnt.

Sputum Cups.—An ordinary mug or jampot answers well for this purpose, if unlike those used in other ways in the same place; it can be sterilized by pouring in boiling water; or it can be lined with butter paper or a special cup-lining, which can be lifted out and burnt with its contents. The ordinary sputum cups with funnel-shaped tops are objectionable, because the funnels become smeared with sputum. A metal sputum cup with hingeless lid has been

designed by Marcus Paterson.¹ If there is no lid, flies may carry about infection; but flies are not common in a well-managed clean sanatorium unless it is near a road or stable. Glass discs are used at the Crooksbury Sanatorium as lids for the sputum cups. In some foreign sanatoria papier-mâché cups are used, which can be burnt with their contents. They are, however, liable to upset with a puff of wind.

Of *sputum flasks* the best known and most widely used is probably Dettweiler's. This, however, is too complicated to be perfect, and is rather expensive. Another kind, made entirely of metal, flat, with a side opening, is the Diskret. This also is too expensive for general use. Various cheaper modifications, mostly with one opening (such as Liebe's and the Crossley) are made.

Sputum flasks with one opening should have it large enough to admit of proper cleansing by mechanical means as well as by boiling. They should be free from corners and angles and cracks, preferably of one material throughout the interior, so that no junctions exist in which dirt might accumulate. They may with advantage be opaque or semi-opaque. They should be readily opened, but not liable to leak; and should be of a convenient shape and size for the pocket.

The contents of these flasks should be destroyed before they dry. Some plain water—or weak disinfectant—should be put into each before use. A double supply will be necessary in a sanatorium, with a few extra in case of defects. They can then be emptied and purified daily. For this purpose steam is probably best where it is available. Boiling water is efficient, but may crack the glass flasks, especially if metal and glass be left in contact, unless the heating is done gradually. In some sanatoria there is a special lavatory with steam jet for sterilizing the sputum cups and flasks.

Sputa.—Various devices have been adopted for sterilizing or destroying the sputa. One of the best is to burn them, with or without sawdust, in a special furnace. In a private house balls of tissue paper or newspaper may be put into the contents of the cup, to make them burn more easily.

Another way is to pour boiling water over the contents, and let them stand in a hot place for half an hour, after which they may be

¹ "Auto-inoculation in Pulmonary Tuberculosis."

poured down the W.C. or drain. In some sanatoria the cups and flasks are immersed in a special apparatus and sterilized by steam or by boiling. If boiling be depended upon, it should be for not less than five minutes.¹ If disinfectants are used, they should be of a kind which penetrates the mass, rather than such as coagulate the contents. Lysol and soft soap are used at Hohenhonnef. Zotal is good, and not very expensive.

ROOMS AND THEIR CONTENTS.

Any room furnished after the style of a sanatorium can be kept free from infection by daily washing of floor and walls (the lower three feet). Excepting when the patient is very ill and helpless or very careless, the danger of infection in a clean room is very small. The precautions taken against raising dust are at the same time precautions against infection. In every good sanatorium however every room is disinfected whenever it is vacated. The chief ways of doing this are, washing or colour-washing the walls; rubbing down or spraying with solution of corrosive sublimate (1 in 1000) by means of a Geneste and Herscher apparatus or some other, 1 per cent chlorinated lime solution, or carbolic solution (1 in 40); or fumigating the walls with formalin vapour. In some places, the walls are repapered; elsewhere they are revarnished.

Furniture of nearly every kind that is exposed to infection can be washed. This also applies to strips of matting or carpet.

Bedding.—Linen that has not been definitely soiled with sputum need only be washed or cleaned in a steam laundry. Any linen or cotton article known to be soiled should be steeped in disinfectant before it is sent to the laundry. Where patients have been very ill it may be necessary to disinfect the bedding in a steam disinfector. The same applies to infected clothing. In some sanatoria the linen is sterilized by steam without removal from the linen clothes bags.

Table Utensils.—In some sanatoria the table-napkins are kept in a special numbered linen pouch. In others only Japanese handkerchiefs are used, and afterwards destroyed. Spoons and forks should be cleaned with boiling water or steam; they may be dried in a hot-air sterilizer. Knives and forks are best made entirely of metal

¹ Schill and Fischer, "Mitth. a.d. k.k. Gesundheitsamt," Bd. ii., 1884, p. 133.

each in one piece. In a large establishment cups and saucers, plates and dishes, as well as the above, could be dried in the hot-air sterilizer.

EXCRETA.

It is not usual to disinfect the urine and fœcal matters from tuberculous patients. Every patient is instructed for his own sake not to swallow the sputa; but tubercle bacilli are quite commonly found, if sought for, in the excreta of such patients, apart from intestinal tubercle. The danger of transmission from such a source is however infinitesimal in a temperate climate. So long as the excreta remain moist, they are harmless; moreover, short exposure to wind and sunlight kills them. If the earth-closet system is used, the product may be mixed with chloride of lime, which does not interfere with nitrification. Most other disinfectants should for this purpose be avoided. In any case, the excreta become quickly enveloped with dense mycelium which prevents the dissemination of small particles. Water-borne sewage may be passed through a septic tank.

Bedpans.—In some sanatoria and hospitals a special steam jet is provided to clean bedpans. If the latter are protected with a lining of newspaper, much unpleasant labour may be avoided.

ATTENDANCE ON CONSUMPTIVES.

Susceptible nurses and relatives should not be allowed to nurse cases with much fever and expectoration. Infection becomes dangerous if the constitutional resistance is impaired; otherwise it may be harmless. Reasonable precautions should be taken to keep those in attendance in good health.

CHAPTER XV.

MEDICINAL TREATMENT.

ALTHOUGH treatment in some sanatoria is still limited to purely hygienic remedies, in others drugs are commonly used for the relief of symptoms, and in some institutions also as general remedies.

For slight ambulant cases in an early stage few drugs are necessary, beyond an occasional aperient. Dyspepsia can often be controlled by dietetic means; cough is seldom very troublesome; insomnia may be met with, but usually improves when more exercise is taken; and arsenical and other tonics, though probably useful, can be dispensed with. It is different, however, when we are dealing with febrile tuberculous cases, in which many remedies may be necessary at one time or another. Chief among these are such as reduce the fever, modify cough and expectoration, and improve the nutrition and heart action.

Fever in pulmonary tuberculosis is usually a sign that insufficient antibodies are being produced. The rational treatment therefore is to reduce the amount of circulating toxins by local and general rest, or to stimulate the production of antibodies.

ANTIPYRETICS

have proved rather disappointing in tuberculous cases with well-marked fever under my own observation. *Quinine* upsets digestion, and is unreliable as an antipyretic. *Antipyrin*, *phenacetine* and *antifebrin* may bring down fever temporarily; but very soon a reaction follows, with perhaps an inverse daily rhythm; or else the patient complains of depression in strength and of uncomfortable sweating. *Cryogenine* is less depressing, but cannot be depended upon to reduce high temperatures without causing discomfort. *Pyramidon*, much used in Germany, is said to be depressing.

GENERAL REMEDIES FOR THE FEBRILE.

Some other general remedies have been credited with the power of reducing tuberculous fever by attacking the cause. Chief among these are iodoform, benzoic and salicylic acids, camphor and its allies, ichthyol, thymol, and arsenical remedies.

Iodoform is strongly recommended by Dewar, who injects it intravenously dissolved in ether.¹

Benzoic and salicylic acids are sometimes prescribed for tuberculous fever. I have seen no striking results from their administration.

Camphor is said to control nightsweats and to reduce tuberculous fever.

Camphoric acid is administered subcutaneously in 10 per cent oily solution,² or in wafers by the mouth. Dr. Walter Koch of Freiburg advocates the inunction of camphoric acid.³

Gomenol, which contains a kind of eucalyptol free from aldehydes, stated to be neither caustic nor toxic, is used in France in 10 per cent oily solution for intratracheal injections. The same solution injected subcutaneously is said to reduce fever, cough and expectoration.⁴

Thymol is recommended by de Renzi as a remedy for tuberculous fever.⁵

Ichthyol was first recommended for tuberculosis by Moritz Cohn and H. Fränkel. It is credited with the power of reducing congestion and fever. It may be given in cachets or palatinoids, or in twenty to forty drop doses in a glass of peppermint water before meals.

Ichthyosol.—A compound of ichthyol with guaiacol, may be given to febrile patients in doses of twelve to forty drops in a glass of water twice daily.⁶

Pneumosan (Amyl-thio-trimethylamine) injected intramuscularly

¹ "Brit. Med. Journal," 21 Nov., 1903.

² "Lancet," 11 July, 1891, 2 Jan., 1892; "Berl. Klin. Woch.," 1898, No. 48.

³ "Berl. Klin. Woch.," 1904, No. 18.

⁴ Barbary, "La Grande Faucheuse," Paris, 1907, p. 121.

⁵ "New York Medical Journal," 6 Aug., 1898.

⁶ Barbary, *loc. cit.*, p. 120.

appears to be of some value in pulmonary tuberculosis, reducing temperatures and improving other symptoms.¹

Colloidal metals have been injected in various septic conditions with success, and also in febrile tuberculosis. Collargol is injected intravenously in doses of 0.05 gramme in a 1 per cent solution once a week for mixed infection.² Electrocuprol injected into the gluteal muscles every other day in doses of 5 c.cm. is said also to bring down temperatures.³ Colloidal cupric phosphate is also said to be useful.⁴

REMEDIES FOR NIGHTSWEATS.

I have never found it any use to give remedies for nightsweats. These are usually a sign of defective ventilation, insufficient food, or a very severe form of tuberculosis. Cases likely to do well do not often suffer from nightsweats when they are put under proper conditions. An occasional nightsweat in a favourable case may be caused by too much bed-clothing; but it does not call for special drug treatment. In an unfavourable case atropin and zinc oxide may be given; but the patient will not be saved thereby. Hot food, stimulants, tepid sponging, and remedies directed against the general weakness, are more useful in such cases.

ELIMINATION OF TOXINES.

Tuberculous toxines are naturally eliminated by the skin, bowels, and kidneys; and by the administration of aperients and diuretics, and attention to the state of the skin, slight feverish attacks in tuberculous subjects may often be favourably influenced. Whenever sedatives are given to diminish cough and expectoration, it is advisable from time to time to give expectorants, to prevent too much retention of secretions in the lungs.⁵ In such cases the addition of iodides in small dose will be useful, as it increases the fluidity of the sputa, and may help in converting the toxines into toxoids. Sulphuretted mineral waters are given for catarrhal conditions in

¹ "Journal of State Medicine," April, 1912; "Lancet," 30 March, 1912.

² Stachowski, "Pester Med. Chir. Presse," No. 32, 1902.

³ Gaussel, "Progrès Méd.," 2 Dec., 1911.

⁴ "Luton Union Méd. du Nord-Est," No. 18, 1913. "Tribune Méd.," Jan., 1913.

⁵ Walters, "Antisepsis and Elimination in Pulmonary Phthisis," "Lancet," 8 Aug., 1896.

France. They increase the fluidity, and later on reduce the quantity of the expectoration.

GENERAL REMEDIES FOR AFEBRILE CASES.

The Creosote Group.

Creosote and its compounds have long enjoyed a great reputation as remedies for pulmonary tuberculosis. Although beechwood creosote and its chief ingredient, guaiacol, prevent the development of the tubercle bacillus in glycerinated broth, it is not certain that its beneficial effect in pulmonary tuberculosis is due to a direct action against the bacillus, rather than to anti-fermentative action in the alimentary canal, or to neutralization of toxines, or the effect on secondary infection. The chief indications for the use of these compounds are, abundant expectoration, intestinal fermentation, and (according to French authorities) a low vascular tension. They have been given in Germany to reduce tuberculous fever; but their administration in such cases is not free from risk. It is said that the tendency to hæmorrhage is increased by creosote; and I believe this is correct.

There are enormous individual differences in the tolerance of creosote.¹ It is therefore advisable always to begin with small doses (m 1-3 *ter die*) and feel one's way. Some individuals, however, can after a time tolerate enormous doses—such as a drachm twice daily. The remedy may be given by the mouth, or by subcutaneous injection in oily solution. It is also largely used for inhalations. If given by the mouth, it may be prescribed after meals in perles or capsules, or in solution with glycerine and tincture of orange; the dose may be taken in a glass of milk.

Intolerance is shown by persistence of the taste, or by vomiting, shivering, or depressed circulation, or melanuria and albuminuria. Creosote carbonate, guaiacol carbonate, styracol, benzosol and thiocol, are less likely to upset the patient than pure creosote or guaiacol; but opinion is divided as to their relative value. Burlureaux² treated some old standing cases with subcutaneous injections

¹ See Burlureaux, "La Pratique de l'Antisepsie," Paris, 1892.

² *Loc. cit.*

of large doses of creosoted oil, with the help of a special apparatus worked by atmospheric pressure. I have myself tried this method in a few cases, and think it useful. The injection should be done very slowly. Solutions of 1 in 5, 1 in 15, or weaker proportions, may be used; the oil should be sterilized and deprived of its fatty acids. Where the nutrition is very poor, the oil introduced in this way is likely to be useful as a substitute for food.

Phenol has been injected subcutaneously in doses of 0·1 to 0·2 c.c. of a 1 per cent solution by Harold Vallow,¹ who praises its effect in early cases.

Dioradin was introduced by Professor Szendeffy. There is much difference of opinion as to its value.

The intravenous injection of *cinnamic acid* is the basis of Landerer's method. This is said² to cause leucocytosis, and also sclerosis in affected parts of the lung. Two strengths are employed, containing respectively 1 per cent and 5 per cent of synthetic hetol dissolved in distilled water or 0·7 per cent sodium chloride. The solution should be neutral or slightly alkaline in reaction, recently filtered, and sterilized each time before use by boiling in a water bath for five minutes. From 1 mg. to 20 mgs. are injected into the cephalic vein every second day in gradually increasing doses, if there is no disturbance. It is stated to be only suitable for early cases, and in the absence of pronounced fever. If there is hæmoptysis, the remedy should be suspended for at least a fortnight. According to Bulloch, hetol increases the formation of antibodies. Lovell Drage³ has advocated the subcutaneous injection of 10 per cent solution of cinnamate of soda in glycerine.

Nuclein.—Some years ago, cultures of yeast were introduced as a remedy for tuberculosis and some other bacterial infections. More recently nuclein and nucleinate of soda have been used for the same purpose.

Chantemesse injects 0·4 gramme of nucleinate of soda in 40 c.c.

¹ "Brit. Med. Journal," 15 July, 1911.

² "Die Behandlung der Tuberkulose mit Zimtsäure," Leipzig, 1898; "Anweisung zur Behandlung der Tuberkulose," Leipzig, 1899.

³ "Lancet," 12 July, 1902; 23 May, 1903.

of normal saline solution as a prophylactic in abdominal operations. Marked leucocytosis follows, with raising of the opsonic index. The effect is more general than in using a specific vaccine, and less marked.¹

GENERAL TONICS.

Arsenic has the property of restraining metabolism, which is known to be excessive in tuberculosis. French physicians who use it largely, insist upon the importance of only administering it intermittently, and in cases where the vascular tension is normal or sub-normal. To avoid gastro-intestinal irritation, sodium cacodylate, soamin and other compounds have been introduced, which are mostly given by intra-muscular injection. Guaiacol cacodylate, recommended by Barbary,² may be injected very slowly in oily or watery solution into the gluteal region, in 1 mg. doses every other day for ten doses, followed by a rest. It is said to reduce fever, increase the appetite, improve sleep, and reduce expectoration.

Phosphorus and some of its compounds have a reputation as remedies for tuberculosis. The late Dr. Churchill was chiefly instrumental in introducing *Calcium Hypophosphite* as a remedy for phthisis; Thorowgood and Sturges also used it freely, the latter especially for glandular enlargements and abdominal tuberculosis. *Glycero-phosphates* are much used in France in pulmonary tubercle;³ *santogen* appears to increase the assimilation of other food.⁴ *Lecithin* is recommended for subcutaneous injection in doses of 5 c.c. It is stated to reduce the elimination of phosphates, to increase the absorption of nitrogen, the appetite and weight.

Calcium Salts have long been recognized as useful in phthisis for their effects on the digestive system and the heart. Dr. Ferrier has introduced a method of treatment, largely dietetic, intended to promote the retention of lime salts in the body.⁵

¹ "Therapeutic Gazette," 15 September, 1907; Huggard and Morland, "Lancet," 3 June, 1905; Vaughan, "Philadelphia Medical News," 17 and 22 December, 1897.

² *Loc. cit.*, p. 103.

³ See Gumpert, "Mediz. Klinik," 1905, No. 41.

⁴ Tunncliffe, "Arch. Intern. de Pharmacodynamie et de Thérapie," vol. XVI, fasc. I, 2.

⁵ "Soc. Méd. des Hôpitaux," 30 Mar., 1906.

REMEDIES FOR COUGH AND EXPECTORATION.

Slight cough, accompanied by expectoration, is best disregarded. Excessive cough, which raises the temperature, exhausts the patient, provokes vomiting or disturbs rest at night, must be restrained. Within limits, expectoration is useful: it is Nature's way of getting rid of waste products from the lungs.

Before prescribing for cough, the probable exciting cause should be inquired into. Much of the cough in phthisical persons is reflex, such as that due to an irritated pharynx or to sudden changes of temperature in the air, an additional argument in favour of reasonably cool rooms. It may also be due to excessive irritability of nerve centres, in which case *heroin* with or without *antikamnia* will be useful. In granular pharyngitis the affected parts may be painted with solution of iodine (gr. 5-10), *potassium iodide* (gr. 20-40), glycerine to 1 ounce. Sedative inhalations (equal parts of *creosote* and *ether*, or *creosote* and *chloroform*) or astringent sprays, pigments or lozenges may also be given. If the cough comes at meal times, compound *menthol* lozenges, or *menthol* inhalations, will often relieve. Reflex gastric cough is best met by giving frequent small meals. For laryngeal cough, steam inhalations of *tinct. benzoin* or of *carbolic acid* are useful. A 5 per cent spray of *benzoate of soda* in an atomizer is good for both laryngeal and pharyngeal cough. Trachitis is said to be relieved by sod. bicarb. with *hydrocyanic acid* and syrup of Virginian prunes.¹ Intratracheal oily injections containing *gomenol* (1 in 10),² or *naphthalene* (2 per cent), at a temperature of 80° or 90° F., coating the affected surfaces mechanically, have a more lasting effect than inhalations.

For bronchial catarrh with tenacious scanty sputa relaxing expectorants (*ippecacuanha* with small doses of *iodide of potassium* and sod. bicarb., or *apomorphine* or *vin. antim.*) are best. If the secretion is abundant, *terpene* in doses of gr. 2-5, dissolved in spirit, with glycerine and peppermint water, is a useful formula; or a pill containing *zinc. sulphate* gr. j., extract of *codein* gr. ss., extract of

¹ A. Latham, "The Diagnosis and Modern Treatment of Pulmonary Consumption," London, 1905.

² A liquid distilled from *Melaleuca Viridiflora*, see p. 75.

hyoscyamus gr. 2, taken after meals.¹ At bedtime full doses of heroin, *codein*, *chlorodyne*, or other sedative may be useful. For pleuritic cough, stimulating embrocations or local rest are probably best. If there is much pulmonary congestion, *ichthyol* should be thought of. Poultices and fomentations are not convenient in open-air treatment. If cough is excited by change of position, postural treatment to empty the cavities concerned should be adopted at a convenient time of day.

INHALATION METHODS.

The late Dr. Sinclair Coghill, Dr. Burney Yeo, Dr. Lees and others strongly recommend continuous inhalation of antiseptics in lung disease. There is no doubt that these allay irritation in some cases, and modify the expectoration. Their chief objection is that they interfere with the air supply. Abundance of air in itself reduces the frequency of respiratory movements. Patients who have been used to open-air methods complain after a time of the oppressiveness of medicated inhalations. I have seen no evidence that these measures affect the tuberculosis directly; probably mixed infection is favourably influenced.

If the secretions are tenacious, a good form is *tinct. iodi ætherealis* ʒij, *acid carbol* ʒij, *spir. vini rect.* ad ʒj—a few drops on an oronasal inhaler whenever necessary. If there is abundant secretion, a better formula is *eucalyptol* ʒj, *chloroform pur.* ʒj, *phenol abs.* ʒij, *creosoti* ʒij, used in the same way (Coghill). Another method is to use an Olberg's glass inhalation pipe with some of the solution.

HÆMOPTYSIS.

The most useful immediate remedies for marked hæmoptysis are inhalation of *amyl nitrite*, or of *spir. terebinth*, followed by the administration of *calcium chloride* (gr. 30-40 every two hours for three doses, then gr. 10-15 every four to six hours) for several days. The patient should be kept absolutely quiet, the chest movements restrained by a bandage or by strapping, the skin kept warm, an aperient given if there is the least indication for it, a dry diet with

¹ A. Ransome, "The Treatment of Phthisis," London, 1896, p. 203.

liquids reduced to 15 oz. per day, cough restrained by suitable remedies, and the room kept cool. It is a grave mistake to place the patient on an insufficient diet. If there be recurring hæmorrhage of slight amount, a semi-recumbent position is often better than complete recumbency. Ablutions should be reduced to a minimum whenever there is marked hæmorrhage, but great care taken to keep the sheets smooth. The bedpan should be used.

Morphine should be reserved for cases in which there is copious hæmorrhage. It has many drawbacks, and in slight hæmoptysis it will do more harm than good.

If the hæmorrhage is so profuse as to threaten life mechanically, the patient should be treated as in drowning—placed in the position in which the blood will drain away most freely, with the head and chest semi-dependent, and morphine carefully avoided lest it should lead to retention of blood in the lungs and choke the patient. If there should be syncope, artificial respiration will be necessary.¹

EMBARRASSED CIRCULATION.

In long-continued high fever the heart is usually weakened. *Strychnine*, *digitalis* and *strophanthus* are each useful at times. Probably some of the recoveries from acute pulmonary consolidation recorded after the administration of *quinine*, *opium* and *digitalis* may be accounted for by the enforced rest, reduced metabolism, and cardiac support which these drugs are able to give.

Oxygen inhalations may relieve dyspnœa and cardiac embarrassment; care should, however, be taken not to induce a craving for the remedy.

DIGESTIVE REMEDIES.

In tuberculous fever a full diet is necessary. Unlike acute infectious ailments of short duration, it is not safe, nor is it desirable, to put the patient on short rations. Having regard to his resting condition, he should have a full nourishing diet, but one of an easily assimilable nature. Small frequent meals are less likely to cause reflex cough and cardiac embarrassment than the three full meals usual in afebrile or chronic tuberculosis. If there is a difficulty in

¹ See Nield in "Bristol Medico-chirurgical Journal," June, 1908.

digestion, this should be met by the administration of partly malted foods, liquid meat, peptonizing powders or glycerine of pepsine, and the like. The usual prescriptions of alkalis with bitters, acids with bitters, bismuth and hydrocyanic acid, and other well-known remedies may be useful to meet these difficulties.

DIARRHŒA.

Persistent diarrhœa is of ill omen in lung disease. After removal of any irritant, the most useful remedies are intestinal antiseptics together with a modified diet. The food should not be bulky, but should be such as is easily absorbed and leaves but little residue—such as raw meat, meat juice, predigested milk, light milk puddings, eggs, butter, cream, cheese with the acid neutralized, jellies, etc.¹

Of intestinal antiseptics, *bismuth salicylate* is one of the best; Burton Fanning recommends using it like table salt.² *Beta-naphthol* is also useful; so is *tannigen*. De Renzi recommends *iodoform* 0·2 gramme, tannin 0·4 gramme, from twice to four times daily.³

¹ See Bardswell and Chapman, "Diets in Tuberculosis," London, 1908.

² "The Open-Air Treatment of Pulmonary Tuberculosis," p. 124, London, 1905.

³ "Riforma Medica," 23 Dec., 1899.

CHAPTER XVI.

TUBERCULINS, VACCINES, AND SERA.

THE treatment of tuberculosis by means of tuberculins and other vaccines is becoming more and more general. These remedies, while applicable in one form or another to almost every phase of the disease, are especially useful in cases where slight exertion causes excessive auto-inoculations, and in those in which even severe exercise fails to produce any sign of auto-inoculations.

TUBERCULIN.

There are many kinds of tuberculin ; but they all agree in containing either dead tubercle bacilli or an extract made from them. Some (such as T.R. and B.E.) contain chiefly endotoxines ; whereas others (such as T.O.) chiefly contain the more soluble exotoxines. Some are made from the bovine variety, others from the human ; and as a rule the former are milder in their action than the latter.

The object of tuberculin is to stimulate the production of specific antibodies. Tuberculous foci are often surrounded by a relatively impermeable barrier. If this breaks down suddenly through ill-health or accident, the dose of toxines introduced into the circulation may be too much for the body to deal with, unless it has been previously prepared against the danger. This preparation may be effected by a course of tuberculin treatment. The toxine present at the seat of disease has much less power of stimulating the formation of antibodies than tuberculin introduced at a distance. On the other hand, tuberculin probably does not contain all the poisons liable to be absorbed from the diseased foci ; so that the treatment by tuberculin should sooner or later be supplemented by a course of auto-inoculations, and vice versa.¹

¹E. C. Hort, "Auto-inoculation versus Hetero-inoculation," "Proc. R. Soc. Med.," April, 1909.

The cases originally recommended by Koch for tuberculin treatment were those without marked constitutional deterioration, with little or no fever, without cardiac or other grave complications, and with disease in an early stage limited to the apex of one lobe. Applied indiscriminately to more serious cases, the remedy fell into undeserved discredit. It is now recognized that by modifying the dose and mode of administration, most forms of tuberculosis can be successfully treated with tuberculin; but it is not equally suitable in all cases; and in some it is dangerous. When the doses of auto-toxine are but small, it is comparatively easy to succeed with tuberculin; but when there is free and excessive auto-inoculation it is a much more difficult matter; and as a rule it is better policy to attempt to reduce the auto-inoculation by other means before starting tuberculin treatment. Where no such reduction is possible, there are two courses open: either to give an anti-tuberculous serum in the hope of neutralizing some of the toxines; or to give rapidly increasing doses of tuberculin at short intervals in order to raise the tolerance of the body as quickly as possible. Neither of these methods is entirely reliable; indeed these cases constitute the most difficult problem in the treatment of pulmonary tuberculosis.

Tuberculin may be given in relatively small doses at long intervals, waiting for the effect of one dose to be exhausted before another is given; or in increasing (and usually somewhat larger) doses given cumulatively. In the latter case, each dose produces some temporary tolerance, and can often be followed by a larger dose without causing any more disturbance. There are several modifications of each of these two chief methods.

SMALL DOSES AT LONG INTERVALS.

This method is chiefly employed for surgical tuberculosis, or to limited pulmonary lesions which do not permit of auto-inoculations. The most useful preparations are those containing endotoxines (e.g. T.R. and B.E.). The initial dose is usually about 0.05 c.mm. in the adult,¹ injections being given at intervals of seven to ten or more days. Wright has proved that very small doses are capable of increasing the formation of antibodies, as shown by the opsonic

¹ Rivi re and Morland, "Tuberculin Treatment," p. 199, London, 1912.

test; and his disciples make this the guide to administration, giving another dose when the first begins to lose its effects. Here there is no question of being guided by temperature reactions, as the dose is too small to raise the temperature. Other authorities give slightly larger doses, and endeavour to increase them, within limits, without provoking fever, but without depending upon the opsonic test.¹ This may be done by a very cautious increase in dosage.

CUMULATIVE DOSAGE.

By this method the tolerance of the body for the tubercle toxins may be rapidly increased, in suitable cases, by giving doses every three or four days at first, every seven days afterwards.

The more soluble preparations (e.g. T.O., P.T.O.) should be used.

The dosage and intervals depend upon the effect aimed at.

There are two chief methods of cumulative dosage, in one of which a febrile reaction is expected, whereas in the other it is avoided as far as possible.

METHOD WITH FEBRILE REACTIONS.

In the early days of Koch's treatment the initial dose was very commonly 0.002 c.c. T. (old tuberculin); a decided febrile rise was expected, and a larger dose was given as soon as this subsided. Amongst those who adhere to this method are Möller, Pickert, and Löwenstein on the Continent and Camac Wilkinson in England. The latter begins usually with P.T.O., continues with P.T. (which he regards as clinically fifty times stronger) and finishes with T. (which he considers to be five times stronger than the last). If there is no febrile reaction, he increases the dose by one half or one third, or in some cases by one fourth or one fifth, after an interval of three or four days. If there be a rise of temperature to 100° F., the next dose is given in five days; if 101°, in six days; if 102°, after a week or more. After a month's interval the dose must be reduced to one fourth or one fifth of the last, and the doses rapidly increased as before. A febrile reaction is usually expected; continuous gain in weight is regarded as evidence that the dosage is correct. Each

¹ Sahli, "Tuberculin Treatment" (Trans. Christopherson), London, 1912.

of the preparations of tuberculin is given in increasing doses until 1 c.c. has been given.¹

METHOD WITH AVOIDANCE OF FEBRILE REACTIONS.

There is a good account of this method in Rivière and Morland's book.² These authors point out that doses which fail to cause a febrile reaction will often cause a local reaction ; and that a marked local reaction seldom happens without a smart febrile reaction, which they regard as evidence of an overdose. They recommend an initial dose of 0.001 c.mm. (not c.c.), increasing to ten times the dose in three or four doses at first, later on increasing to ten times the dose in ten doses, or even more gradually. If there be no reaction, the doses are repeated at intervals of three or four days until a dose of 10 c.mm. has been reached, when the doses are given once a week.

If a local reaction takes place, the same dose is repeated in a different spot ; and the dose is not increased so long as there is any local reaction. They regard a maximum dose of 100 c.mm. ($\frac{1}{10}$ c.c.) as usually sufficient, unless in an advanced case the symptoms have not improved up to this dose, or unless the patient cannot be kept under observation.

REPETITION OF THE TUBERCULIN COURSE.

It is generally admitted that sensitiveness to tuberculin, which was lost as the result of treatment, usually returns after a time ; and the question arises whether this is an indication that another course of tuberculin is necessary. Petruschky, Bandelier and Röpke, Möller, and Camac Wilkinson, answer this in the affirmative ; but Rivière and Morland³ give good reasons for a different opinion. The reactivity to tuberculin may be great when there is little disease, small or absent when there is extensive and progressive disease, so that it cannot be taken as the sole criterion. The need for further treatment will depend chiefly on the existence or otherwise of signs of activity in the chest, or of symptoms indicating tuberculous disease ; and the reactivity to tuberculin should only be

¹ "Tuberculin in the Diagnosis and Treatment of Tuberculosis," London, 1912.

² *Loc. cit.*

³ *Loc. cit.*

regarded as a confirmatory test. Moreover as the tubercle bacillus is not the sole cause of tuberculous illness, the possible need of further hygienic treatment should also be remembered, especially if the conditions of life are not favourable.

TUBERCULIN IN FEBRILE CASES.

The treatment of such cases has already been discussed (see p. 75). When auto-inoculation has been reduced to the smallest possible extent by rigid rest in bed and other measures, minute doses of tuberculin are often useful, and if given judiciously may reduce the maximum temperature and the range.¹ R. W. Philip employs Beraneck's tuberculin in such cases, beginning with doses of one millionth of a cubic centimetre and gradually working up to larger ones. A succession of preparations is necessary: each one may be ten times stronger than the previous one (as used by R. W. Philip) or twice as strong (as used by Sahli), or some intermediate figure, which I have myself found more convenient.

Other preparations specially recommended for use in febrile cases are albumose-free tuberculin (T.A.F.), sensitized tuberculin (S.B.E.), and Bruschettini's siéro-vaccino.

Whatever preparation be used, the dose should be extremely small (e.g. 0.0002 c.mm. P.T.O. or T.R.) and very gradually increased, and the intervals short. The optimum dose for a febrile case may for a time be much smaller than the initial dose for an afebrile one. Doses which cause a just perceptible rise of temperature should be continued without increase or reduction; but allowances must be made for rises of temperature due to auto-inoculations from slight causes, such as coughing fits or extra ablutions. It is not good policy to reduce the dose slightly if the previous one seems too large. Either the same dose should be repeated at a longer interval, or a much smaller (say ten times smaller) dose given, and the doses again gradually worked up. To reduce the dose slightly may sometimes cause anaphylaxis with much constitutional disturbance.

In using very minute doses, no alteration in temperature beyond twenty-four hours afterwards should be attributed directly to the

¹ A. Latham, "The Uses of Tuberculin in Pulmonary Tuberculosis," "Proc. R. Soc. Med.," V. 5, March, 1912.

tuberculin, unless it be part of a definite wave which began within twenty-four hours. It is especially the next eight hours' temperatures that should be noted, so that for such cases the dose is best given in the morning and the afternoon temperatures then compared with those of the previous few days. Accurate thermometry is most essential.

ANTITOXIC SERA.

These are intended to reduce the fever by passive immunization. Those chiefly in use are Maragliano's and Marmorek's. Bruschetini's siéro-vaccino also belongs partly to this group. I have used each of these ; but the results have been disappointing. Habershon recommends Marmorek's serum in early tuberculous infiltration, to be administered with a glass funnel and tube in saline or other convenient fluid per rectum, after a cleansing enema. The dose is 5-10 c.c. ; rectal administration reduces the danger of urticaria.

Normal horse serum has been prescribed by A. Latham in conjunction with tuberculin, which he gives by the mouth. I have seen no convincing results from the remedy. Diphtheria antitoxic serum, recommended by Dr. A. Hubbard, may cause distressing stiffness of muscles.

VACCINES FOR MIXED INFECTION.

When fever depends chiefly on mixed infection, a corresponding vaccine may be of great value. The best results are obtained in staphylococcus and pneumococcus infections. Streptococcus infection is often refractory. Catarrhalis infection may disappear under the influence of open air alone.

MODE OF ADMINISTRATION OF VACCINES.

A. Latham has shown that tuberculin will give rise to a therapeutic response if given by the mouth on an empty stomach. Personally I have found this method unsatisfactory.

The most convenient method is by subcutaneous injection into the arm, forearm, or leg, or between the scapulæ. Koch often injected beneath the skin of the iliac fossa. The skin may be previously rubbed with pure lysol, or 1 in 20 phenol, or spirit, or painted with

tinct. iodi; a place chosen free from blood-vessels and the needle plunged nearly vertically into the subcutaneous tissue while a fold of skin is pinched up. Injections into the skin itself are usually painful. The syringe may be sterilized by 1 in 20 phenol (in methylated spirits) followed by distilled water or normal saline; or by oil at 150° C. (Almroth Wright's method) or by heat. The objection to heat sterilization is that it soon blunts the needles. Platinum-iridium-pointed needles stand it best. No dressing is usually required in a cleanly person.

AMBULANT TUBERCULIN TREATMENT.

No febrile patient should be treated with tuberculin as an out-patient. Moreover, the doses given to an out-patient should be such as do not raise the rectal temperature above 100·4 under the actual conditions of life. Tuberculin causes congestion of affected foci, and may lead to secondary febrile reactions if the dose is too large or combined with excessive auto-inoculations. If the latter are large, the resulting disturbance may be quite out of proportion to the dose of tuberculin. Some idea of the reactivity of tuberculin may be obtained by a graduated von Pirquet test.¹ The best means of measuring the effect of auto-inoculations is probably the rectal exercise temperature after a test walk or a test task of work. The opsonic index is not convenient for general use, and cannot be depended upon as a guide to dosage.

Tuberculin should be given with caution where there are extensive areas of fine crepitation, or evidence of recent softening. Cases with extensive lesions of long standing are usually more tolerant, and may be safely treated as ambulant patients if the general condition is reasonably good and no fever present. Early febrile cases require much more careful handling.

GRADUATED EXERCISE AND TUBERCULIN.

If tuberculin is given to patients doing graduated exercise, the early doses should be relatively small, until the effect is known. Moreover, it is not wise to increase the exercise at the same time as the dose of tuberculin. I have been accustomed for the early doses

¹ Egbert C. Morland, "Lancet," 7 Sept., 1912.

to prescribe rest on the day following an evening injection, or the day of the injection if this is given in the morning. For the later doses the exercise has been halved immediately after the dose. Probably, however, the usual amount of exercise might safely be taken if the doses were very cautiously increased.

CHAPTER XVII.

THE SELECTION OF PATIENTS AND CLASSIFICATION ON ADMISSION.

THERE are two chief objects in selecting patients for treatment : to determine whether they are fit for ambulant treatment, and whether they require institutional treatment or can be treated in a private house.

RESTING OR AMBULANT CONDITIONS.

The chief criterion is the temperature. If the temperature is over $98\cdot6^{\circ}$ F. (37° C.) in bed before breakfast, or it rises above $99\cdot8$ per rectum, after half an hour's rest during the day, rest is necessary. If mouth temperatures are adopted, the windows should be shut for a quarter of an hour previously and the room be fairly warm ; then the thermometer should be inserted under the tongue and kept in with closed lips for another quarter of an hour. If the mouth temperature rises above $98\cdot6^{\circ}$ F. in the early morning under these conditions, or above 99° F. at any other time of the day, rest is necessary. In women another half degree may be allowed. To be quite sure of the result, the second temperature should be taken about 5 p.m., as the maximum is usually some time between 3 and 7 p.m. in tuberculous cases. Exceptionally the highest temperature will be in the morning ; and the safest way is to keep the patient under observation for a week, taking temperatures four times a day. Not uncommonly the temperature ebbs and flows in a wave of long duration, so that it may be very different at the beginning and end of the same fortnight. Cases that appear to be fit for ambulant conditions at one time may later on require strict rest.

Other reasons for keeping at rest are, recent hæmoptysis, a pulse rate over 100 at rest, marked loss of strength or malnutrition, or such

complications as fistula or phlebitis which of themselves make repose desirable.

The extent of the lung trouble by itself does not constitute an indication for rest, unless there be recent infiltration with sharp crepitations. In the latter case the mischief is likely to spread unless rest is taken, and fever to follow.

INSTITUTIONAL TREATMENT.

Whether treatment can be satisfactorily carried out in a private house, or whether residence in an institution is necessary, depends on many considerations. Among these are climate and surroundings, the possibility of free ventilation, the absence of overcrowding, a satisfactory food supply, proper cleaning of the rooms and attendance, sufficient medical supervision, satisfactory nursing or the absence of any need for it, the character and intelligence of the patient, willing co-operation on the part of his household, the absence of any need for physical training.

In every case, residence for a time in a sanatorium is useful for its educational results. Also, those who become feverish after small doses of tuberculin, and those who make unsatisfactory progress in a private house from whatever cause, should be transferred to a sanatorium.

CLASSIFICATION ON ADMISSION.

No classification which is based upon physical signs alone is of any value as an indication for treatment or a guide to prognosis. There are early cases of small extent with well-marked fever; and cases of long standing with widespread mischief but with little or no fever; and the degree of fever is far more useful as an indication than the extent of the damage. On the other hand, after widespread destruction of lung tissue there will always be some physical disability; and recent lung trouble which shows evidence of spreading or of extensive breaking down is more dangerous to life than an old fibrosed lesion.

Classification should therefore be twofold: anatomical and physiological.

Anatomically, we should distinguish a group in which no ab-

normal physical signs can be detected, the diagnosis being effected by means of tuberculin or by such symptoms as slight hæmoptysis. Some of these cases are probably glandular rather than pulmonary ; in others the lesions are not distinguishable from conditions present in those who never show signs of tuberculosis.

The others may be classified by the Turban Gerhardt system ; but the third group requires subdivision, as many cases with more extensive disease have to be treated in chest hospitals and sanatoria.

I would therefore propose the following classification :—

PULMONARY CHANGES.

PHYSICAL SIGNS.

I. Doubtful.

Absent, or limited to slight apical friction, or prolonged, or interrupted expiration over one apex.

II. Very slight = Turban Gerhardt, I.

Slight infiltration of not more than half a lobe in all ; not below level of third dorsal spine, nor below that of clavicle if bilateral, or of second rib cartilage if unilateral.

III. Slight = Turban Gerhardt, II.

Disease of slight severity more extensive than the previous group, but affecting at most the volume of one lobe, or severe disease extending at most to the volume of one half lobe.

IV. Moderately advanced = Turban, II.

Slight infiltration of greater extent than the above, but not affecting more than the equivalent of two lobes ; or severe lesions of half this extent.

V. Far advanced = Turban, III.

Disease of greater extent than the above.

Evidence of Slight Infiltration.—Slight dullness, with bronchial or blowing respiration, or prolonged expiration, or rough interrupted

breath sounds (other than pleural) or slightly diminished breath sounds, with fine or medium-sized crepitations, or *râles*. In the absence of adventitious sounds, the above-mentioned physical signs may indicate a quiescent fibrosed lesion, if the air entry be good. Dullness due to pleural thickening should also be excluded.

Evidence of Severe Lesion.—Well-marked dullness; bronchial or amphoric breathing with medium and large *râles* and corresponding changes in vocal resonance; or great diminution in breath sounds not due to pleuritic effusion and accompanied by squeaking inspiratory sounds; or evidence of cavitation with *râles*.

Abnormal physical signs attributable to pleural conditions, or to fibrosis without catarrh or recent infiltration, or to a dry cavity, should not be taken as evidence of a severe lung lesion in classifying the case.

A *physiological* classification should be based chiefly on the degree of fever and the pulse rate, and where temperature and pulse rate are normal, on the amount of exertion that can be taken without disturbing the temperature unduly. I have already proposed¹ a subdivision into three groups for cases attended with fever.

The following table gives the indications:—

	A.	B.			C.		
		a.	b.	c.	a.	b.	c.
Max. temp.	not over 38° C. (100·4° F.)	38·1-38·5 (100·5-101·3)	not over 38°	not over 38°	over 38·5°	not over 38°	not over 38°
Pulse rate	not over 90	not over 90	91-120	not over 90	not over 120	over 120	not over 120
Weight loss	not over 10 kgr. (22 lb.)	not over 10 kgr.	not over 10 kgr.	10-15 kgr. (22-33 lb.)	not over 15 kgr.	not over 15 kgr.	over 15 kgr.

The temperatures are to be taken at rest per rectum, and refer to the maxima for the twenty-four hours. The pulse rate is to be taken at rest after at least half an hour without coughing fit or exertion. The loss in weight should be from the highest known weight in health, or if this be not known, the standard for height, age and sex. The American Medical Association has adopted 100·5 F. as the dividing line between incipient and more serious cases; 100·4 is

¹ International Tuberculosis Congress, Rome, 1912; "Lancet," 20 July, 1912.

a more convenient figure because it corresponds exactly with 38° C. In the addenda to Turban's classification,¹ 38.5° C. (or 101.3° F.) is suggested as the division between slight and severe fever. Seeing the large number of tuberculous cases with temperatures above 101.3 that apply for treatment, there is perhaps room for additional subdivisions—such as one at 102.2° F. (39° C.), when "typhoid rest" becomes necessary. The journey to the place of treatment often causes an extra rise of temperature. On the other hand, many cases with a long wave of temperature show a rising temperature during the week of admission. I would suggest that in order to avoid these fallacies, the average of the first week should be taken, or the temperature of the third day. All febrile cases would naturally be kept at rest.

If it be desired to simplify this classification, it could be based entirely upon temperatures, in which case patients with temperatures not over 38° C. would fall into class A, over 38° and not exceeding 38.5° into class B, over 38.5° into class C. The error would probably be small.

Cases with complications should be classified on exactly the same lines, but put into a separate division: they may be indicated as Ac, Bc, Cc. Severe or persistent digestive disturbance (vomiting or diarrhoea) should be regarded as a complication. Slight digestive troubles may be ignored in classification. The American Medical Association regards expectoration of more than 30 c.c. in twenty-four hours as evidence of a lesion that is no longer slight. Having regard to the frequency of catarrh due to mixed (and often passing) infections, I think this is not a good criterion.

Severe hæmoptysis (beyond one fluid ounce or 30 c.c.) may be classed as a complication; slight hæmoptysis in no way alters the prognosis, and may be ignored.

AFEBRILE CASES.

These should by rights be classified according to the capacity for exercise during the week of admission; but this is not usually easy of estimation. In many sanatoria patients are always kept in bed for the first week; and it is unusual to put anyone on to the full

¹ K. Turban, "Diagnosis of Tuberculosis of the Lung," trans. E. C. Morland, 1905, p. 49.

amount that he is probably capable of. A rough estimate may be arrived at according to the working capacity during the week preceding admission. The kind of work must be taken into account, and may be classified into light or sedentary, ordinary manual and heavy manual labour. The standard for ordinary manual labour may be digging or sawing deal wood, or any other kind which involves about the same exertion (Paterson's third grade). Any kind of work decidedly less taxing would be classed as light work, anything decidedly more laborious as heavy work. Any patient who was accustomed to do work of one grade, and was unable to do so during the week before admission, but was found to be free from fever on admission, would fall into the preceding group. There would therefore be :—

(1) Those incapable of light or sedentary work.

(2) Those capable of such work but not of ordinary manual work.

(3) Those capable of the latter, but not of laborious manual work.

Inman divides patients into those febrile at rest, those afebrile at rest but febrile if ambulant, those afebrile when ambulant but becoming febrile if they do work. The first of these groups would correspond with the three febrile divisions proposed here; the ambulant febrile would correspond with those incapable of light or sedentary work. Probably any patient who could not walk for two hours without well-marked rise of temperature would be unfit for light work. Most of those afebrile under ambulant conditions but becoming febrile when they worked would fall into the second group proposed here.

CHAPTER XVIII.

ROUTINE IN A SANATORIUM.

THE PATIENT'S DAY.

FROM the point of view of the patient at a sanatorium, the day is taken up with meals, rest, exercise, taking of temperatures, and doctor's visits. The routine differs a little according to the nature of the sanatorium—whether for middle class or working class patients; but the chief difference is in the earlier hours and larger proportion of domestic work in the latter.

At *Nordrach Colonie* in the Black Forest, patients used to rise at 7-7.30 a.m., breakfast at 7.45, dine at 1, sup at 7; temperatures were taken before rising, on returning from the morning walk at 11.45, on returning from the afternoon walk, and after getting into bed at 9 p.m. The time from 8.30 to 11.45, and from 2 to 4.30 or later was taken up with rest or walking, mainly hill climbing. The hour before dinner and that before supper was devoted to rest on the lounge chair in the bedroom. From 8 to 9 p.m. was the time allotted to recreation, consisting in reading, conversation, and music, but no games. The febrile patient was rigidly isolated and kept in bed, where he saw the doctor and the maid but nobody else. Meals were taken with the doctor, who prescribed substantial helps and insisted on everything being eaten. He also visited patients as a rule three times a day, before breakfast and during the rest hours.

At one good British sanatorium for the middle classes, breakfast is taken at 8.30, lunch at 1.30, tea at 4.30, dinner at 7. Temperatures are taken before 7.30 a.m., at 1.15 p.m., 6.45 p.m., and after retiring to bed; the two middle temperatures being taken after an hour's rest. The pulse rate is counted by a nurse before rising, and on returning from the morning walk. Patients go to bed at 9.45;

lights are put out at 10.30. The time between 8 and 9.45 is devoted to quiet recreation; and in the afternoon by special permission croquet and other games may be indulged in. An hour's rest is taken after lunch and dinner, as well as an hour before these meals. Patients are only allowed to visit each other in the short time between rest hour and lunch or dinner, and between 8 and 9 p.m. Visitors from outside are not allowed in the morning, unless for exceptional reasons.

In another well-known British sanatorium the routine is much the same, excepting that the temperatures are taken at mid-day immediately after the morning walk.

At another institution, for the working classes, patients rise at 6.30, have breakfast at 8, dinner at 12.30, tea at 4, supper at 7, and go to bed at 7.30. They take an hour's exercise before breakfast, an hour and a half in the morning, the same in the afternoon before tea, an hour between 5.30 and 6.30, and spend half an hour in recreation after this. The remainder of the day is taken up in resting.

THE WORK OF THE MEDICAL OFFICERS.

Daily visits are paid to the patients before breakfast, during the hour's rest before lunch and dinner, and if necessary after bedtime.

Other duties are, to inspect and if necessary alter the menu, giving directions to the nurses for special cases; to prescribe the amount of rest and exercise for each ambulant patient, and supervise any graduated work that is taken; to keep a general watch on the patients, encouraging one, warning another, seeing that rules are understood and obeyed, and prescribing the form of recreation permissible. Symptomatic treatment, injections of tuberculin, etc., laboratory work, care of the surgery, ordering drugs, and correspondence with doctors and friends, take up much of the time daily.

Examinations and reports are usually made on admission and departure, once a month during residence in the sanatorium, and as required in the intervals. This includes examination of the sputum; in case of a negative result, the sputum should be examined daily for a week.

In a private sanatorium the chief medical officer often has other duties which fall to the steward or secretary in a large public insti-

tution, such as some of the financial work and ordering necessary repairs. The nurses are under his control ; and it is his business to receive medical and other visitors.

EDUCATION OF THE PATIENTS.

This is an important part of the duty of a sanatorium medical officer. According to the capacity of the individual patient, he should be taught the following details :—

Temperatures : how to take them, the difference between a rest temperature and an exercise temperature ; and what degree makes it advisable for him to go to bed. This is settled for him while in the sanatorium ; but he should be able to apply the knowledge at home after leaving.

Exercise : to regard this as equivalent to a dose of medicine, not to be shirked, nor to be exceeded.

Rest : not the same as loafing about.

Excitement : to be avoided.

Food prescribed must be eaten ; not a mere matter of taste ; certain proportions are to be observed.

Ventilation : draughts are good ; wind is bad ; screens are permissible.

Temperance in all things is essential.

Infection is easy to avoid, but certain rules must be strictly observed. How to deal with the sputum at home ; how to avoid spreading infection by coughing, and on fingers, etc.

Dirt and dust are dangerous : a wet cloth is a better means of removing them than a duster or broom.

Chills and cold catching : how they can be avoided ; how far they are due to infection.

Recovery is conditional ; and good health will only continue if the laws of health are observed.

Healthy people are the better for sanatorium ways of life.

CHAPTER XIX.

THE RESULTS OF TREATMENT.

THESE depend on three factors : on the nature of the case, the nature and circumstances of treatment, and the after conditions. The bacterial attack itself is of all degrees of severity, as regards both dose and virulence ; there are similar differences in the contributory causes, and in the constitutional powers of resistance. In one case the infection does not even lead to illness ; in another, compensation is only attained after years of struggle ; in a third, the constitutional powers are too feeble to fight against the disease, which rapidly ends in death. If then we wish to estimate the value of any particular form of treatment, we must be specially careful to compare like with like, and to deal with sufficiently large numbers to avoid fallacies from unknown or unrecognized factors.

Very few if any of the published statistics on the subject have taken account of these elementary rules of comparison. Groups of cases are compared which differ in extent and severity, in amount of constitutional disturbance, in conditions of life and pecuniary resources, in the place and climate in which they are treated, the methods of treatment, the duration of treatment, and the amount of after care. It is impossible to extract reliable statistics from such a mixture.

It is especially fallacious to argue against modern methods of treatment because of early relapses after treatment. If in a case of heart disease compensation is attained under Nauheim treatment but is quickly lost under the strain of an arduous life, this is no argument against the method of treatment. To prove the value of tuberculin or inhalations or any other remedy it is not sufficient to show that one group of cases was treated more successfully with it than another without it. We must first make sure that the two

groups were clinically similar, and the other conditions the same. A group containing a large proportion of very early afebrile cases, or of chronic fibrosed lesions, would be easier to treat successfully than another group with early lesions but much fever and little power of compensation.

Especially fallacious is the appeal to survivorship, unless we take into account the after-conditions. To discredit sanatorium treatment because of the shorter lives of those treated in a sanatorium, is much the same as condemning Carlsbad treatment because those who have been treated there do not live as long as the average of their own class in society. Sanatorium treatment is but short compared with the after-conditions; and these have more to do with survival than a short spell of treatment, however efficient. It is true that the educational effect of a sanatorium continues after the patient leaves; but lessons may have been well or ill learnt, well or ill applied, possible or impossible of application at home and at work.

To measure the value of any particular method of treatment, or remedy, we must make our comparisons between groups of cases which are clinically similar, and treated for the same length of time under conditions which are identical in all but the one respect which is being investigated.

The clinical similarity must include the age period and sex, race and social class, extent and severity of the local disease, the absence of complications, and the degree of constitutional disturbance.

Groups of cases should be analysed to show these details, and like compared with like in sufficient numbers. Much more useful results would be obtained in this way than by disregarding the constitutional disturbance, or by mixing up constitutional and local changes, as is usually done.

A mass of valuable statistical evidence has been prepared in the German sanatoria; but it is impossible to compare the results with those in British or American Chest Hospitals, because only the local condition is taken seriously into account. Where the constitutional impairment is mentioned it is only vaguely defined. When it is stated that working capacity has been regained, this may mean two very different things in, say, a clerk and a navvy; and such a statement is not sufficiently exact to be of much value.

If, however, the kind of work were classified as suggested in chapter XVII. and the local and constitutional measure were taken accurately at the beginning and end of a term of treatment—say three months, six months or twelve—evidence of great value would be obtained.

In sanatoria where hill-climbing and walking are the only recognized forms of exercise, it would be necessary to estimate the equivalents as compared with the three grades of manual work. The standard of comparison for the middle grade would be six hours' digging in already worked ground, or sawing deal wood for the same length of time.

In a British sanatorium it is exceptional for the patient to stay until he is apparently cured. Even a specially favourable case requires six months for this; and a severe case may need twelve or more. Any statement of results should therefore be of a kind which can be applied to short courses of treatment, such as the period of three months, which is usual in England and Germany. The first beneficial effect of adequate hospital or sanatorium treatment is the establishment of compensation against the toxines, shown by disappearance of fever, and restoration of the general health. While this is being accomplished the local lesion may actually increase for a while, even if later on it is arrested—just as an abscess may cause further destruction of tissues before finally healing up. The fundamental classification of results should therefore be constitutional, with a subclassification according to anatomical results. There would be four divisions, according as the general health is restored, improved, stationary, or worse; and five subdivisions according as the local disease is apparently arrested, reduced in extent, quiescent but not reduced in extent, quiescent but increased in extent, or still progressive.

In the King Edward VII Sanatorium classification of results, the terms employed are: (1) disease arrested; (2) much improved; (3) improved; (4) stationary; (5) worse; and local and general factors are included but not distinguished.

Disease arrested is defined as complete restoration of general health, and complete arrest of local disease, there being no physical signs present, or only such as are compatible with a completely

healed lesion. *Much improved* is defined as general health completely restored; physical signs, though much diminished, not entirely cleared up, e.g. perhaps limited to a few moist sounds on cough only; T.B. still to be detected in the sputum. *Improved* is defined as: general health, though improved, only imperfectly restored. Physical signs, though less marked than on admission, still present. The other definitions need not be quoted.

There is no fault to find with the first group. The second and third should be subdivided according as the local disease is reduced in extent, the same in extent, or increased in extent, yet quiescent. If the disease is still progressive, the case would fall under one of the last two groups—stationary or worse.

To summarize, the results would be tabulated thus:—

A. General health completely restored.

1. Local disease apparently arrested—no T.B. in sputum.
2. Local disease now quiescent—still T.B. in sputum:—

<ol style="list-style-type: none"> (a) reduced in extent (b) the same in extent (c) increased in extent 	}	= much improved.
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B. General health imperfectly restored.

1. Local disease now quiescent:—

<ol style="list-style-type: none"> (a) reduced in extent (b) the same in extent (c) increased in extent 	}	= improved.
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2. Local disease still progressive.

C. General health stationary

1. Local disease quiescent

<ol style="list-style-type: none"> 2. Local disease still progressive 	}	= worse.
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D. General health worse

Such a statement of results is however still an imperfect measure of progress, because it takes no account of the original state of health, and is insufficiently graded. The starting point should be taken into account as well as the finish.

The general condition at the start and finish may have been one of six: high fever, moderate fever, or no fever at rest; no fever or disturbance on light or sedentary work, none on ordinary manual work, or none on laborious manual work.¹ There is therefore room for five degrees of general improvement.

¹ For definitions see Chapter XI, p. 56.

The local improvement might be estimated as under, according to the nature and extent of the local lesion :—

Lesion Originally Active.	Degrees of Improvement.	Lesion Originally Quiescent.	Degrees of Improvement.
Still active, extent less	1		
Quiescent „ more	2		
„ „ the same	3		
„ „ less	4	Quiescent, extent less	1
Arrested „ more	5	Arrested „ more	2
„ „ the same	6	„ „ the same	3
„ „ less	7	„ „ less	4

Degrees 1 to 4 might be regarded as “improved,” 5 to 7 as “much improved”.

An active lesion is one which is extending its bounds or undergoing destructive changes. Loss of breath sounds or the appearance of fine crepitations in fresh places is highly suggestive. Coarse râles or the absence of breath sounds are by themselves no evidence of an active lesion. There may be no expectoration with an active lesion; absence of T.B. from sputum on repeated examination is against activity.

SURVIVAL TESTS.

If the length of survival in good health is adopted as a criterion of the value of sanatorium (or any other) treatment of pulmonary tuberculosis, cases should be excluded who left with evidence of existing disease, or whose home or working conditions were unsatisfactory. If these are included, it is not a test of sanatorium (or tuberculin or inhalation or other) treatment, but chiefly of the conditions of life. The man perhaps broke down owing to such unsatisfactory conditions: compensation was attained under treatment, but was not maintained under adverse conditions.

SUBSEQUENT REPORTS.

Owing to the difficulty in obtaining reliable medical evidence of the health of patients who have removed to a distance, the information is usually classified according as the patient is well, alive, dead or lost sight of. It would often be possible to ascertain also whether he were engaged in light or sedentary work, ordinary manual work, or laborious work; and the information would be useful.



PART II.
DESCRIPTIVE.



SECTION I.—AMERICA, UNITED STATES.

CHAPTER XX.

GENERAL SUMMARY.

THERE has been an enormous increase in the accommodation for cases of pulmonary tuberculosis in the United States during the last few years, especially in the Northern States near the Atlantic Coast and the Great Lakes. Much has been done to provide for the more advanced cases in tuberculosis pavilions and wards of general hospitals, and in special tuberculosis hospitals. Most of the institutions receiving cases of pulmonary tuberculosis are prepared to admit them in any stage. There appear to be over 26,000 beds available in the sanatoria and similar institutions of the United States. (Population 84,000,000.)

There are over 500 Anti-tuberculosis Associations scattered over the States, and most of the towns in the Northern States have tuberculosis dispensaries, while many have tuberculosis classes for instruction in special hygiene. In the older States there is an increasing tendency to substitute State aid for private charity, and enormous sums are being spent annually as subventions for the tuberculosis sanatoria and dispensaries. The National Association for the Study and Prevention of Tuberculosis in the United States¹ spent during 1911 over £2,360,000 in the erection of new sanatoria and hospitals, and about £540,000 in other ways. Nearly two-thirds of the money raised in the various States for maintenance of existing institutions came from public funds, £940,000 from State appropriations, and £1,140,000 for county or local purposes. In addition to this, the Federal Government spends about £200,000 per annum in maintaining special sanatoria. Some of the older States

¹ Third Annual Report, 1911. See also "Lancet," 10 February, 1912.

are compelling the erection of sanatoria and dispensaries under penalties, and the State contributes £1 per week for every patient treated in a special tuberculosis hospital erected by any town, if the patient cannot afford to pay for himself.

Many tuberculosis camps have been started. These often precede the erection of sanatoria, as all the essentials of treatment can be given in such a camp in a suitable district.

The arrangements for combating tuberculosis in some of the Southern States appear to be inadequate. For Negroes, there are in Massachusetts the Free Home for Consumption in the city of Boston, with 110 beds, open to patients of any colour, and the St. Monica's Home at Roxbury for coloured women and children. In Virginia, the Tuberculosis Pavilion at the City Home, Norfolk, with thirty beds, is open to white and coloured alike. There are also a few dispensaries open to Negroes.

The provision for consumptive Indians in the United States amounts to five sanatoria or camps, with a total of 150 beds. Two are in Arizona, one in Idaho, one in New Mexico, and one in Oregon.

There has been an enormous increase in the number of open-air schools in the United States during the last two years. The first school of this kind was opened in January, 1907, in Providence, R.I. On 1 January, 1910, there were thirteen; now there are over 200.¹ These are not solely intended for tuberculous children.

In the following description, the United States are divided into six parts, two on the Atlantic coast or near it, one on the Pacific coast, one in the south, and two central groups.

For much of the information I am indebted to the "Tuberculosis Directory" (New York, 1911), published for the National Association for the Study and Prevention of Tuberculosis.

¹ "Tuberculosis," Berlin, Sept., 1912, Vol. II, No. 9.

CHAPTER XXI.

THE ATLANTIC STATES—NORTHERN GROUP.

COMPRISING Maine, New Hampshire and Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania.

In the above-mentioned States, there are altogether 218 sanatoria or similar institutions, with a total of 16,000 beds. The large majority receive cases in all stages of the disease ; twenty-nine with 2488 beds only receive early cases ; sixteen with 719 beds only advanced cases ; twenty-six with 1401 beds are for the insane ; four with 277 beds are in connexion with prisons ; six with 177 beds are exclusively for children ; seven others with 435 beds receive children as well as adults. There are twenty-seven day camps with a total accommodation for 1375, and six night camps with a little over ninety beds. There are also thirty-six open-air schools with 1099 places, intended for anæmic, tuberculous, crippled or delicate children, and twenty-one more schools are being established.

The arrangements for New York City are wonderfully complete. The city is divided into twenty-nine districts, each with its own Clinic or Dispensary ; each one of these serves patients from its own district alone. There are three kinds of sanatoria : (1) semi-public, receiving no grants from the authorities, and free to admit or reject patients coming to them ; (2) the New York State Hospital for Tuberculosis in the Adirondacks, with 160 beds, paid for by the city, patients being admitted by the Hospital Admission Bureau ; (3) the Municipal Sanatorium at Otisville, with 502 beds, to be eventually increased to 1200 or 1500. Here admission is free, and all stages likely to benefit are admitted, the administration being under the Department of Health. Of hospitals for the tuberculous there are : (1) those for advanced cases, with a total of nearly 3500 beds, to be 5200 in the near future. (2) A Detention Hospital with 300 beds (to be 500) under the Sanitary Authorities, for undesirable, homeless, dissolute, vicious, or destitute cases. Here also are taken those

(111)

who have insisted on leaving other sanatoria but who have no suitable homes. (3) Hospitals for tuberculosis of bones and joints : a small one at the seaside and another for 200 beds being constructed.

There are also a number of Open-Air Camps, in disused ferry boats or on housetops ; a Tuberculosis Preventorium for children, in New Jersey with about 170 beds ; a Day Nursery for children from tuberculosis families ; open-air schools for anæmic and ill-conditioned, crippled or tuberculous children ; open-air homes for tuberculous families, to the number of 300, established through the generosity of Mrs. William K. Vanderbilt ; a Home Hospital for tuberculous families ; and a temporary home to provide shelter for tuberculous children and young women pending their admission to an institution, or after their discharge.

The farm colony is represented by the Otisville Sanatorium, where many forms of industrial occupation are carried on.¹

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
MAINE—					
Maine S., Hebron	1904	14 or less	Dr. Estes Nichols	I.	100
Glenellis S., Andover	1905	12-25	Dr. F. E. Leslie	I., M.	10
† Camp of Antitub. Ass., Bangor	1910	5	—	I., M.	6
† S. and D. C. Central Maine Antitub. Ass., Fairfield	1910	4	Dr. A. A. Downs	—	25
NEW HAMPSHIRE—					
State S., Warren Summit	1909	10 or less	Dr. J. E. Runnells	All	34
Pembroke S. for Tub., Concord	1901	15-25	—	E., M.	35
‡ Hillsborough Co. Hosp., Grasmere	—	—	—	—	40
VERMONT—					
† Tub. D. C., Brattleboro	1910	7 or F.	—	I., M.	10
Vermont S., Pittsford	1907	7½	Dr. Walter C. Klotz	I., M.	40
MASSACHUSETTS—					
Lakeville State T. S., Middleboro	1910	4 or F.	Dr. Sumner Coolidge	All	150
State T. S., North Read- ing	1909	4 or F.	Dr. E. B. Emerson	All	150
State S., Rutland	1898	4 or F.	Dr. P. Challis Bartlett	E.	350
State T. S., Westfield	1910	4 or F.	Dr. H. D. Chadwick	All	150
‡ State Inf., Tewksbury	1900	F.	Dr. John H. Nichols	All	300

¹Hermann M. Biggs, "Administrative Control of Tuberculosis," 12th Ann. Rep. Canad. Assoc. Prev. Tub.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
MASSACHUSETTS <i>cont.</i> —					
+ Summer Camp S. Anti- tub. Ass., Adams	1910	F.	—	I., M.	10
+ C. H. and D. C., Boston	1909	F.	Dr. S. F. Cox, Dr. F. P. McCarthy	—	250
Channing Home, „	1857	F.	—	All	23
Cullis Cons. Home, „	1864	F.	—	A.	40
c. Free Home for Cons. in the City of Boston, Dorchester	1892	F.	—	All	110
‡+ w. * House of the Good Samaritan, Boston	1861	F.	—	All	68
McCreight S., Dorchester	1904	8-25	Dr. W. B. Keelor	I., M.	12
‡ Long Island Hosp., Boston H.	—	F.	Dr. G. W. Holmes	All	85
+ Prendergast Camp, Boston	1909	6	(Ass. Relief and Contr. Tub.)	Conv.	12
c. w. * St. Monica's Home, Roxbury	1888	5-8	—	All	10
‡ Bd. of Health H., Brookline	1905	7 or F.	Dr. H. Lincoln Chase	A., men	6
+ * D. C. for children, „	1908	F.	„	E.	25
Tub. H., Cambridge	1908	8-10	Dr. Bradford H. Pierce, Dr. T. F. McGirr	All	60
‡ Holy Ghost Hosp. for In- curables, Cambridge	1894	7 or F.	Dr. John S. Sommers	A.	45
‡ Soldiers' Home, Chelsea	1909	F.	Dr. G. H. Maxfield	All	12
T. C. Ass. Relief and Control of T., Clinton	1909	4-6	Dr. Irene M. Morse	All	8
Millet S., E. Bridgewater	1900	15-40	Dr. C. S. Millet	C.	30
Bay View H., Fall River	1907	F.	Dr. David H. Fuller	M., A.	60
+ D. C. Cons., Holyoke	1908	Cost or less	Dr. C. A. Allen	M.	20
Munic. Tub. P. at Poor Farm, Holyoke	—	F.	—	—	28
+ D. C. Antit. L., Lawrence	1908	F.	Dr. H. F. Dearborn	Amb.	16
Munic. H. for T., „	1910	4-12	Dr. A. L. Siskind	All	88
+ Gen. H. T. C., Lowell	1906	F.	—	I.	28
Hillcroft Lunenburg	1909	10-15	—	I., M.	4
* + T. C., Lynn	1909	4 or F.	Dr. H. P. Bennett	I., M.	20
Antit. Ass. S., New Bedford	1908	var.	Dr. E. F. Cody	All	50
H. Tub. P., Newton	1910	15	—	—	10
Lower Falls					
Springside S., Pittsfield	1906	18	—	—	12
+ Camp Mt. Pleasant, Quincy	1910	7	—	A., M.	60
Central Elm S., Rutland	1909	8-10	Dr. George N. Lapham	I., M.	18
Crane S., „	1910	15-25	Dr. Walter C. Bailey, Dr. B. T. Crane	I., M.	20
Huntress House, „	1909	10-15	Dr. George N. Lapham	I.	20
Maple Lodge S., „	1906	15-18	„	I., M.	12
Pine Cottage, „	1909	8-10	„	I., M.	11
Power Cottage, „	1909	8	„	I.	6
Wachusett Cottage, „	1903	12-15	Dr. B. T. Crane	I., M.	15

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
MASSACHUSETTS cont.—					
‡ H. Contag. Dis., Salem	1907	—	Dr A. H. Galvin, Dr. W. H. Noyce	—	8
† Salem D. C. „	1908	F.	Dr. W. G. Phippen	E.	50
w. Sharon S., Sharon	1891	10	Dr. V. Y. Bowditch, Dr. W. A. Griffin	E.	23
H. for Cons., Somerville	—	F.	Dr. F. L. Morse	—	30
† S. C. Ass. P. T., Springfield	1908	2½	Dr. Ralph B. Ober	E.	25
T. Hosp., Waltham	—	—	—	—	—
* Conv. Home of Children's Hosp., Wellesley Hills	1903	7 or less	—	Surg.	35
RHODE ISLAND—					
R. I. State S., Wallum Lake	1905	5 or F.	Dr. H. Lee Barnes	I., E.	130
* Crawford Allen Mem. Pav., Rhode I. Hosp., East Greenwich	1907	F.	Dr. John M. Peters	Surg.	40
St. Joseph's Hosp., Annex Hills Grove	1905	7 or F.	(St. Joseph's Hosp., Providence)	A.	60
‡ State Almshouse, Howard	1897	F.	Dr. F. B. Jewett	All	44
‡ City Hosp., Providence	1910	F.	Dr. D. L. Richardson	A.	35
† D. C. League for the Supp. Tub., Providence	1908	F.	(Rhode Island Hospital)	All	50
CONNECTICUT—					
Hartford Co. State T. S., Hartford	1910	4-10 or F.	Dr. C. C. Corson	All	114
New Haven Co. State T. S., Meriden	1910	4-10 or F.	Dr. J. B. Dinnan	All	122
Fairfield Co. State T. S., Shelton	1909	4-10 or F.	Dr. Wm. Stockwell	All	102
Lake View Tub. Pav., Bridgeport	1907	F.	(Supt. of the Poor)	All	30
† Middlesex T. C., Cromwell	1910	7	Dr. Jas. Murphy	I., M.	14
Dr. Shannon's S., Falls Village	1906	25-35	Dr. T. I. Shannon	I., M.	25
Nath. Withrow Mem. Tub. Pav., Greenwich	1912	7-25	No resident physician	I.	8
Foresters of America T. S., Hartford	—	—	—	—	—
* Preventorium Soc. Prev. T., Hartford	1909	35 c.	Dr. H. F. Stoll	E.	30
Wildwood S., Hartford	1902	7-10	Dr. W. B. Bartlett	E.	50
Dr. Brook's S., New Canaan	1896	25	Dr. M. J. Brooks	E.	28
Tub. D. C. Visiting Nurse Assoc., New Haven	1910	F.	Dr. F. B. Standish	I.	25
Tub. Pavilion Gen. Hosp., New Haven	—	—	—	—	—
Tub. Pavil., Stamford	1910	7 or F.	—	All	20
Gaylord Farm S., Wallingford	1904	7	Dr. David L. Lyman	E.	85
NEW YORK—					
State H. for Incip. Tub., Raybrook	1904	5	Dr. Albert H. Garvin	I.	260

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
NEW YORK <i>cont.</i> —					
‡ Albany Co. Almshouse, Albany	—	F.	(Overseers of the Poor)	A.	34
Albany Hosp. Tub. S., Albany	1910	8	Dr. Harold C. Goodwin	All	60
Central Feder. of Labour Tub. Pav., Albany	1908	7	Dr. And. McFarlane	All	14
N.Y. State Sold. and Sailors' Home, Bath	1911	F.	Dr. C. K. Haskell	All	100
Montefiore Home Coun- try S., Bedford St.	1897	F.	Dr. L. Rosenberg	E.	180
Mountain S., City Hosp., Binghamton	1908	?	(Dr. J. W. Sheffield)	All	19
J. N. Adam Hosp. for Incip. Tub., Perrysburg	1912	F.	Dr. Otto Eichel	I.	150
† D. C. for Cons., Buffalo	1908	F.	Dr. George J. Eckel	All	60
† Erie Co. Hosp., „	1902	5 or F.	Dr. Carroll J. Roberts	All	90
† Tub. Pav. City Hosp., „	proj.	—	—	A.	350
† Co. Hosp., Cattaraugus	—	—	—	—	—
Ontario Co. S., E. Bloom- field	1910	8½ or less	Dr. S. R. Wheeler	All	16
Westchester Co. T. Hosp., East View	1904	F.	(Dr. F. E. Russell)	All	64
City T. S., Elmira	1909	10 or F.	Dr. Arthur W. Booth	All	30
† Co. Hosp., Fulton	—	—	—	—	—
† Sanatorium Gabriels	1897	10-15 or F.	Dr. J. H. Blankemeyer	E.	70
Jefferson Co. Tub. Hosp., Natural Bridge	—	—	—	—	—
Ulster Co. Tub. Hosp., Kingston	1909	F.	Dr. A. C. Gates	All	25
w. * Stony Wold S., Lake Kushaqua	1903	7	Dr. H. S. Goodall	E.	106
Buckley House, Liberty	1895	10-25	—	I.	75
Halliday Cottage, „	1907	8-15	—	I., M.	12
Loomis S., „	1896	5-40 or F.	Dr. H. Maxon King	E., M.	179
Metropolitan Cottage, „	1909	8	—	All	14
Sunnyside, „	1909	8	—	All	20
Tobin Cottage, „	1908	10-15	—	Conv.	8
Wilkinson House, „	1909	10-18	—	I.	13
Workmen's Circle T. S., Liberty	1909	F.	Dr. E. Singer (Dr. C. Rayevsky)	I., M.	80
† Montgomery Co. Hosp.	—	—	—	—	—
Metr. Life Ins. Co. S., Mount McGregor	1912	F.	—	—	100
Newburgh T. S., New- burgh	1910	7	Dr. W. H. Snyder and others	All	30
† Niagara Co. Hosp.	—	—	—	—	—
Onondaga Co. T. S., Onondaga Valley	—	—	—	—	—
† Oswego Co. Hosp.	—	—	—	—	—
Otisville San., Otisville (N.Y. City Dep. Health)	1906	F.	Dr. Walter L. Rathburn	All	502
T. S. and Hosp., Pough- keepsie	1909	7-9	Dr. Grace N. Kimball	All	40

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
NEW YORK cont.—					
I. O. F. San., Rainbow Lake	1910	F.	Dr. D. Albert Rose	I., M.	75
Mountain View S., Raybrook	1911	15	—	I., M.	20
† D. C. of Public Health Assoc., Rochester	1908	F.	Dr. M. E. Leary	Amb.	50
Iola San., " (Monroe Co. T. Hosp.)	1910	10 or less	"	All	30
Munic. Tub. Hosp., Rochester	1904	7 or less	Dr. G. W. Goler	I., M.	72
Feder. of Labour and State Charities Aid Assoc. Tub. Pav., Rome	—	—	—	—	—
w. Hill Crest Santa Clara	} 1895	7	Dr. Marie L. Chard	I., M.	{ 54
w. Uplands "				I., M.	
Adirondack Cottage S., Saranac Lake	1885	7	Dr. Lawrason Brown and others	I., M.	110
Collins Cottage, "	—	25-45	—	All	5
Evergreen Lodge, "	1906	17-35	—	I., M.	20
Hill Crest Cottage, "	—	12-20	—	All	11
Marquis Cottage, "	—	25-40	—	All	8
Neal Cottage, "	—	13-25	—	All	7
Reception Hosp., "	1903	7	Dr. E. R. Baldwin	All	18
Rumenapp Cottage, "	1902	12		All	22
St. Mary's of the Lake, Saranac Lake	1910	5-25 or F.		A.	16
† Saratoga Co. Hosp., Saratoga	—	—	—	—	—
Schenectady Co. Hosp., Schenectady	1908	var.	Dr. P. McPartlon	I., M.	50
† Steuben Co. Hosp.	—	—	—	—	—
w. * Syracuse Hosp. for women and children, Syracuse	1909	7-28	—	Surg.	20
Lakeview San., Troy	1910	F.	(Dr. H. W. Carey)	All	52
Tupper Lake San., Tupper Lake	1910	25-40	Dr. Chas. Ryttenberg	All	20
Camp Healthmore, Utica	1910	var.	Dr. Florence I. Staunton	I., M.	20
Warren Co. Tub. Hosp., Warren Co.	—	—		—	—
† * N.Y. State Hosp. for crippled and deformed children, West Haverstraw	1900	F.	Dr. Newton M. Shaffer, Dr. O. H. Cobb	Surg.	36
Munic. Hosp. for Cons., Yonkers	—	—	—	—	—
Sprain Ridge Hosp., Yonkers	1908	5	(Dr. W. J. Vogeler)	—	25
NEW YORK CITY—					
† Ferry Boat Middletown D. C., New York	1907	F.	Dr. B. H. Waters	All	126
† Ferryboat Southfield D. C., New York	1908	F.	Dr. J. A. Miller	All	120

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
NEW YORK CITY <i>cont.</i> —					
† Ferryboat Westfield D. C., New York	1909	F.	Dr. John H. Huddleston	I., M.	100
‡ Home for Incur. „	—	10	Dr. Israel C. Jones	A.	12
House of Rest for Cons., New York	1869	F.	—	A.	60
Metr. Hosp. Tub. Inf., New York	1902	F.	Dr. Chas. B. Bacon, Dr. W. A. Polglass	All	800
‡ Montefiore Home, „	1884	F.	4 Resident Physicians	A.	44
† N.Y. Co. Red Cross D. C., New York	1908	F.	Dr. Morris Class	I., M.	75
Riverside S., „	1903	F.	Dr. N. Gilbert Seymour	All	322
w. * St. George's Roof	1909	F.	„	I., M.	20
‡† Camp, New York					
St. Joseph's Hosp., New York	1882	5-10 or F.	Dr. Henry Wollner	All	525
m. Seton Hosp. Seton, New York	1895	10-20 or F.	—	All	200
w. * Seton Hosp., Nazareth, New York	„	„	—	All	175
‡† T. C. of N.Y. Throat Hosp., New York	1909	7 or F.	Dr. H. H. Curtis, Dr. E. J. Birmingham	I., M.	65
Central Labour Union Tub. Pav., Brooklyn	—	—	—	—	—
Home for Cons., „	1881	F.	12 visiting phys.	All	115
Tub. Cottages of King's Co. Hosp., Brooklyn	1909	F.	Dr. John F. Fitzgerald	All	93
† St. Anthony's Hosp., Woodhaven	—	—	—	A.	—
‡ St. Peter's Hosp., Brooklyn	—	F.	Dr. T. M. Lloyd and seven others	All	124
Sea Breeze Hosp., Coney Island	1904	8 or F.	Dr. F. H. Albee	Surg.	43
† Susquehanna Ferry Boat D. C.	1909	F.	—	E., M.	200
‡ Sea View Hosp., Staten Island, Richmond	1913	F.	Dr. E. S. McSweeny	—	800
NEW JERSEY—					
N. J. San. for Tub. Dis., Glen Gardner	1907	5 or F.	Dr. Sam. B. English, Dr. H. B. Dunham	I., M.	170
‡ Essex Co. Hosp. for Contag. Dis., Belleville	1911	F.	Dr. Henry E. Ricketts	A.	96
* Tub. Preventorium for Children, Farmingdale	1909	F.	Dr. A. F. Hess	—	168
Hill Crest O. A. San., Hackensaw	1907	10-25	(Dr. Horace Greeley)	I., M.	25
† D. C. of Antitub. Assoc., Newark	1909	F.	Dr. T. W. Corwin	I., M.	25
‡ Newark City Hosp., Newark	1909	F.	—	A.	36
* The Grove, N. Vineland	1910	7-15	—	I.	10
† D. C. Antitub. L., Orange	1909	F.	Dr. Ralph H. Hunt	I., M.	15
‡ Memorial Hosp., „	1906	8	„	All	26
‡ City Hosp., Passaic	1909	F.	Dr. Nelson Elliot	All	14

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
NEW JERSEY cont.—					
† Isol. Hosp., Paterson	1910	F.	Dr. F. E. Agnew	A.	40
Plainfield Tub. Pav., Plainfield	1909	F.	Dr. F. J. Hughes	I.	8
Hudson Co. T. S., Se- caucus	1909	—	Dr. Berthold S. Pollak	All	132
Union Co. Tub. Hosp., Union Co.	—	—	—	—	—
Newark City T.S., Verona	1908	5	—	I., M.	60
PENNSYLVANIA—					
Penn. State S. Mountain San., Mont Alto	1907	F.	Dr. F. C. Johnson	All	850
State San. for Tub., Cresson	—	—	Dr. S. G. Dixon	All	250
State San. for Tub., Hamburg	—	—	„	All	250
Mountain S., Blue Ridge	1905	12-25	Dr. A. Barr Snively	I., M.	35
Bon Air San., Bradford	1908	5	Dr. O. F. Kunkel	All	36
Phila. Jewish S., Eagle- ville	1909	F.	Dr. A. J. Cohen	I., M.	40
Lititz Springs S., Lititz Springs	1904	10	Dr. Jas. C. Brobst	I.	32
Pittsburgh City Home and Hosp., Marshalsea	1906	3-5 or F.	Dr. E. R. Walters	All	125
Forney San., Mont Alto	1910	15	Dr. Wm. S. Ash	I., M.	20
Dermady Cottage S., Morton	1903	15-35	—	—	30
Grand View S., Oil City	1904	? F.	—	All	30
Home for Cons. Protest. Episc. Miss., Phila.	1876	F.	Dr. C. M. Montgomery	All	80
Hosp. of H. Phipps Inst., Phila.	1903	F.	Dr. H. R. M. Landis	I., A.	24
Lucian Moss Home Jewish Hosp., Phila.	1900	F.	Dr. E. A. Jarecki	All	40
† Phila. Gen. Hosp.	1898	F.	Dr. Henry Sykes	All	430
Rush Hosp., Phila.	1892	7-20	(Dr. S. Solis Cohen and others)	All	50
Rush Hosp. (County) „	„	„	„	„	40
Munic. Hosp., Pittsburg	—	—	—	—	—
Tub. League Hosp., „	1907	7-10 or F.	Dr. Wm. Chas. White, Dr. K. H. Van Norman	I., A.	80
Mt. St. Michaels S. (R.C.), Reading	1910	F.	Dr. A. M. Rothrock	All	50
Neversink Mountain T. S., Reading	1910	F.	„	All	20
West Mountain S., Soranton	1903	5-7 or F.	(Dr. J. M. Wainwright)	All	24
Clair Mont S., Wh. Haven	1910	10-15	—	I., M.	10
Fern Cliff S., „	1904	12-15	—	M.	30
Sunny Rest S., „	1901	20-30	(Dr. A. M. Shoemaker, Dr. W. F. Wood)	—	50
White Haven S., „	1901	7-10	Dr. L. F. Flick, Dr. A. Armstrong	All	216

Signs and contractions: † = tuberculosis camp; || = night camp; D. C. = day camp; ‡ = general hospital or infirmary with special ward or pavilion for tuberculosis; * = admitting children; w. = for women; c. w. = for coloured women; S. = sanatorium; T. S. = tuberculosis sanatorium; Co. Hosp. = county hospital; Inf. = infirmary; Ass. = Association; I. = incipient; M. = moderately advanced; E. = early; A. = advanced; Conv. = convalescents; c. = curable; Surg. = surgical tubercle. The number of beds is that available for tuberculous cases.

THE MAINE STATE SANATORIUM, HEBRON.

Situation : In the foothills of the White Mountains two miles from the Portland and Rumford Falls Railway. *Soil* : Loam over gravel. *Grounds* : 320 acres, about half forest land.

Buildings : Administration, pavilions for patients, power-house, cow-barn lighted by electricity and supplied with running water, milk-house heated by steam and supplied with light and power, chapel, etc. The patients' pavilions are grouped behind the administration block. This includes consulting rooms and a few rooms for ambulant patients, in addition to offices and staff accommodation. The interior is finished in hard plaster with rounded angles. The patients' pavilions, six in number, of wood on stone foundations, consist of two wings with deep verandah, and a posterior extension containing dining-room, kitchen and (in the Infirmary block) operating rooms, the whole forming a Y shaped structure. The verandah is as deep as the wards, which are separated from the corridor by dressing-boxes. The rooms are ventilated and lighted by transoms above the verandah. The lavatories and W.C.'s are behind the verandah. A subterranean tunnel connects the Infirmary block with the administration building.

Cost of administration building, \$50,000 ; of the Infirmary block, \$30,000.

REFERENCE.—T. S. Carrington, "Tuberculosis Hospital and Sanatorium Construction," New York, 1911, pp. 34, 57, 105.

THE VERMONT STATE SANATORIUM, PITTSFORD.

Situation : On a flat piece of land with mountains on all sides, protected on the north by evergreen forest, with a steep fall of ground to the south. *Soil* : Gravel and sand.

Buildings : Consist of a central administration block with the infirmary on the second floor, and of cottages for a dozen patients each on either side, connected with the main building by covered ways. The dining-room projects eastwards from the back of the main building, near the kitchen quarters. The wards and a large common room occupy the south front, with two large verandahs looking east and west. The centre of the south front is open, form-

ing a pair of sun parlours ; and there are two more pairs near the east and west ends similarly constructed.

THE MASSACHUSETTS HOSPITALS FOR CONSUMPTIVES.

There are four sanatoria under the control of this organization : at Rutland, North Reading, Lakeville, and Westfield. The daily average of patients at Rutland State Sanatorium was 345 in 1911, 160 at each of the three other sanatoria.

Average stay : About 150 days. The admissions were 531, 302, 356 and 323 respectively.¹

MASSACHUSETTS STATE SANATORIUM, RUTLAND.

Situation : In the open country one and a half miles from a small village, one and three-quarter hours' rail from Boston, and one hour's rail from Worcester. It is just near enough to the coast to have a "suspicion of sea-air" after several days of east wind. *Soil* : Sand and rock with much mica schist. *Grounds* : 330 acres, comprising the greater part of a hill with a southerly aspect, and extending eastwards to a lake which provides the water supply. Farm lands of 130 acres. Shelter to north and north-west by hills and pine woods.

Buildings : The sanatorium consists of a number of one-story pavilions radiating from the convex side of a semicircular corridor (fig. 1). Behind the centre of this is the kitchen block, with servants' dining-room, and in front of it the nurses' dining-room. Behind the kitchen block are the laundry and disinfectory, and still farther back the dynamo and engine-room. The western pavilions are for men and the eastern for women ; and the latter also have separate dining-rooms. The pavilions are alternately long and short, the former having dining-rooms attached to them behind the circular corridor. The part of the pavilion immediately in front of the latter consists on one side of private wards, and on the other of bath-rooms, lavatories and a nurses' room. Then come in succession a large ward for eight beds, a circular ward with from four to six beds, and another ward with eight beds, terminating in a sun-room and a piazza. The shorter pavilions have only one large ward instead of

¹ Fifth Annual Report, 30 Nov., 1911.

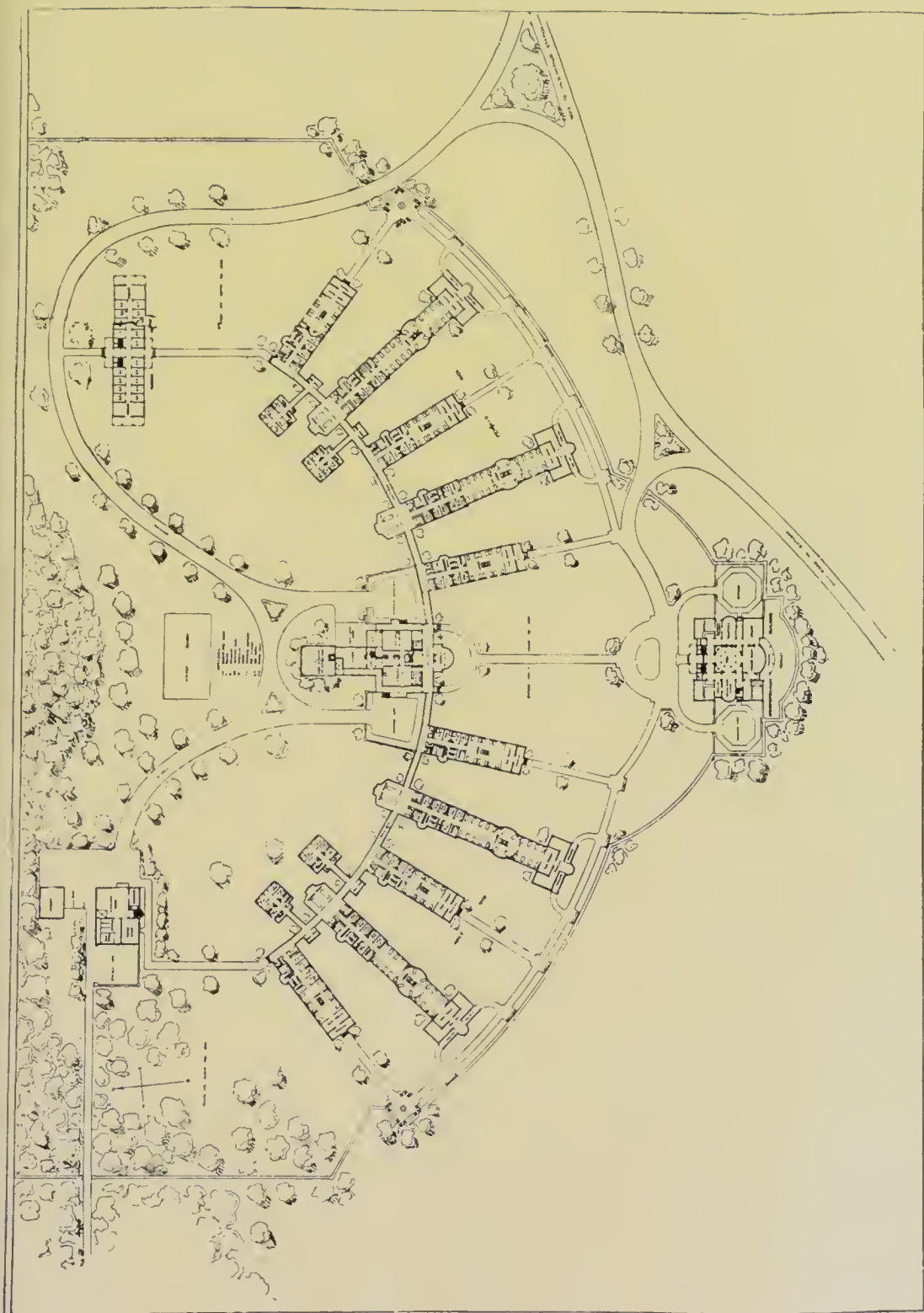


FIG. 1.—THE MASSACHUSETTS SANATORIUM



two, and no circular ward. Alternating with the above-mentioned pavilions, but radiating northwards from the circular corridor, are two pavilions on either side, each consisting of small wards, nurses' room, bath-rooms, etc. Some distance in front of the centre of the semicircle is an administrative block with offices and separate kitchen. The nurses sleep in another block at the north-eastern corner of the ground; a corresponding block to the north-west consists of a mortuary, stables and coach-house. The wards have large windows and have an air space of over 1200 cubic feet per head. Every room has an inlet for warm air and an outlet for foul air, the former being supplied by four fans and engines in the basement. Ventilation is, however, mainly effected by open windows. The interior walls are finished in hard plaster, with rounded angles; the outer walls are rough cast, roofs finished with tar and gravel. There are four additional buildings, one of which serves as a probationary ward, the other as an infirmary.

Average stay: About a year; unsuitable cases being dismissed after a few weeks. The payments by patients cover about one-third of the cost.

REFERENCE.—F. R. Walters, "Lancet," 19 Aug., 1899. S. A. Knopf: "Prophylaxis and Treatment of Pulmonary Tuberculosis," p. 167; Phila., 1899.

THE FREE HOME FOR CONSUMPTIVES IN THE CITY OF BOSTON.

Founded by the Young Ladies' Charitable Association of Boston, open to poor consumptives of every age, stage, nationality, creed, and colour.

Situation: In Dorchester, a suburb of Boston, Massachusetts.

Buildings: Of wood with fire-brick sectional walls every 50 feet. There is an administrative building and a two-story main building for the patients, with large and small wards, recreation hall, consulting rooms, etc. Heating and ventilation on the plenum system, the air being introduced centrally and heated by coils.

REFERENCE.—S. A. Knopf, *loc. cit.*, p. 169.

THE SHARON SANATORIUM.

Founded by Dr. V. Y. Bowditch, with the help of public subscriptions.

Situation: One and a half miles from the village and railway station on the Providence Railway, eighteen miles from Boston, amidst hilly pine-clad country. *Soil*: Gravel and sand to a depth of 30 feet. *Grounds*: 130 acres of woodland, with southerly slope. Protection by hills to north-east and west, and by thick pine woods near by.

Buildings: Two rectangular blocks of two stories on different levels, connected by a narrower central part, each provided with canvas-covered balconies on to which the beds can be rolled out. The first floor of the east wing connects with the ground floor of the west wing. Floors of hard wood with rounded angles in the newer part; walls painted. Separate bedrooms for the patients. Heating by hot air; hot-water supply in the bath-rooms. Open fireplaces in the older west wing.

THE WILDWOOD SANATORIUM, CONNECTICUT.

Situation: A little plateau three miles from Hartford Town Hall, on farm land bequeathed to the Hartford Hospital, protected on the west and south-west by a grove of cedar trees, overlooking the town and country to north and east, with the Massachusetts mountains in the distance.

Buildings: A wooden building on brick and stone foundations, with deep verandahs and southerly aspect. Half the verandah roof is of glass, and the ends are glazed. There are ten private rooms, and a ward with forty beds. Patients sleep in the verandah.

Financial: Erected by private subscriptions with State subventions. Much of the money was raised by the working classes.

REFERENCE.—“Journal of the Out-door Life,” Trudeau, Adirondacks, Sept., 1907, Vol. IV, No. 8.

THE MUNICIPAL SANATORIUM, OTISVILLE, NEW YORK,

is a wonderful example of modern organization. It belongs to the Department of Health for the City of New York, and is only open to residents in the city, preference being given to citizens of the United States, America. All stages of disease are received, but if no progress is made within a reasonable time, patients are transferred to one of the City Hospitals.

Situation: On the south-eastern slope of the Shawangunk Mountains, on the Erie Railroad seventy-six miles from New York.

Grounds: 1300 to 1400 acres. *Altitude:* 800 to 1500 feet.

Buildings: Are of many types. The earliest were wooden "shacks," but the majority now consist of hollow tile and concrete buildings. There is a large administration building, to which are attached the men's dining-hall and kitchen, and the infirmary. In another large building are the women's dining-hall and kitchen. There are also a large laundry, with disinfector, a model dairy, vegetable farm, electric power station, poultry farm, etc.

The municipal vaccine stables and antitoxin stables for New York are also located here, together with the staff concerned. Most of the patients are quartered in small shacks consisting of a central dressing-room and two adjacent sleeping porches each with six or eight beds; these porches have proved to be more popular as well as more airy than sleeping rooms. Excepting between 5 and 9 p.m. and in the morning when patients are dressing, windows are never shut; and owing to the severity of the winters it has been found more convenient to dispense with plumbing and fixed wash-basins in the men's quarters, substituting portable wash-stands and basins. In spite of temperatures at times below zero F., there have been no deaths from any acute respiratory disease since the place was opened; and there has been no drawback from subjecting the inhabitants of overheated city rooms to completely open-air conditions. The women are quartered in somewhat larger and warmer buildings of two stories, with hot- and cold-water baths, and individual cubicles instead of large wards. There are also baths in two large centrally situated buildings. Each building or shack has its own heating plant, as convalescing patients can attend to small installations better than large ones. An infirmary for 100 beds is to be built.

General Arrangements: New-comers are received for a week in a reception pavilion, and afterwards drafted off to one of the other buildings, according as they are capable of ordinary work, of only light work, or in need of nursing (infirmary cases). On the eighth day they are placed in charge of the captain of the walking squad, and take rapidly increasing walking exercise, from ten minutes twice

by Dr. St. John Roosa and the late Dr. Alfred Loomis. There are practically only two seasons, winter and summer, with a rapid transition between the two. The winters are cold and dry, while even in summer the air is dry and exhilarating, and the nights cool and refreshing.

The sanatorium stands on a southerly slope, protected by a rocky wooden ridge to the north. *Grounds*: 193 acres, laid out with roads and paths, surrounded by open country.

The buildings are scattered across the turf and connected by paths. The largest is the administration building (fig. 2), a picturesque three-story building of wood and stone with verandahs and round pointed roofs, and out-buildings attached in a long line beside it. This contains on the ground floor the reception-room, library, dining-room, offices, drug-room, butler's pantry, kitchen, store-room and laundry. On the next floor are the solarium, four emergency wards, laboratory, nurses' rooms, baths and closets, guest rooms and sleeping quarters for the resident staff. On the third floor are servants' quarters and store-rooms. Another building, the casino, is a two-story building with pointed roof and large open verandah devoted to amusement, and containing a billiard table, piano, harmonium, etc. The other buildings consist of cottages (fig. 3) with a variable number of bedrooms, ranging from twenty-three to four apiece. Many of these have verandahs which are protected by glass at the exposed ends. There are bathrooms and closets in every cottage, averaging one to every four patients. Each cottage has one or two parlours. The bedrooms average 11.8×14 feet in size, some provided with chimneys. Nearly all accommodate but one patient, eight have beds for two apiece. Each building is heated by its own hot water or steam pipe plant, and is lighted with electricity from a central dynamo. Ventilation is by open windows, through the steam heating level, and through the open fireplaces. The temperature is not allowed to exceed 65° F. by day and 40° by night in the winter months. There is also a memorial chapel. A special feature is the nurses' training school, the members of which are given practical training every day, and lectures and recitations every four days. The superintendent is a graduate of a New York training school; the course of training of two years' duration. The physician in charge lives

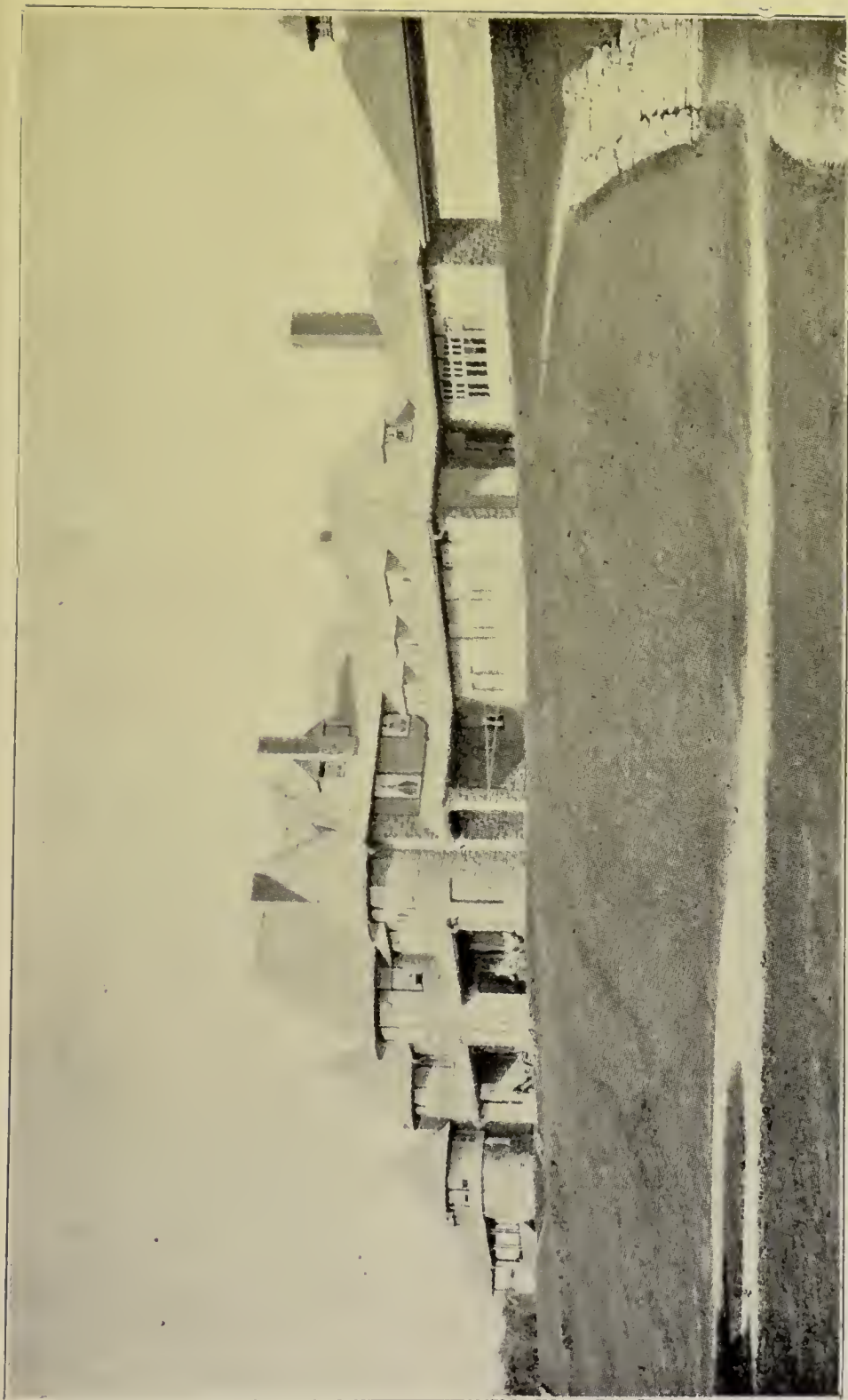


FIG. 2.—THE LOOMIS SANATORIUM—ADMINISTRATIVE BUILDING



in a separate house; a house physician and assistant house physician are lodged in the administration building. There is a completely equipped laboratory, and an infirmary for those requiring special care. The usual duration of treatment is about six months. The charges are only sufficient to render the sanatorium self-supporting. In some of the cottages, patients are admitted who pay higher fees and bring their own servants. The medical management is vested in a medical board which is mainly in New York, but is represented at the sanatorium by the physician in charge. Business matters are managed by a board of ladies in New York, and at the sanatorium by a lady superintendent.

REFERENCE.—S. A. Knopf, *loc. cit.*, p. 149; Carrington, *loc. cit.*, pp. 20, 122, 142, 162.

THE ADIRONDACK COTTAGE SANATORIUM.

Situation: One and a half miles from the village of Saranac Lake, in the Adirondack Mountains, about thirteen hours by rail from New York. *Soil*: Sand resting on primary rocks. *Grounds*: About forty-five acres, surrounded on most sides by densely wooded heights covered with evergreen trees, which protect the place against wind. The sanatorium itself is several hundred feet above the Saranac River valley, on a protected shelf-like plateau on a hillside which slopes to the east and south-east. The prevailing winds are west and south. The *climate* in winter is cold, with many windless snowy days. Snow lasts from the middle of November to the middle of March or April. Rain and snowstorms are frequent; and cloudy weather preponderates at all seasons, especially in winter. Generally speaking, the climate is cold and moist, but in winter cold and dry.¹

Buildings: Twenty-three different buildings, from 70 to 100 feet apart, grouped around a large main structure on three floors, which contains the administrative and consulting rooms, together with a few large rooms for patients (fig. 4). One of the buildings, enclosed by glass, is used as a recreation pavilion; it always has two sides open. Another building forms the infirmary, for cases requiring to be kept in bed. The cottages are one-story buildings for from two to nine patients each. Every patient has his own bedroom, opening into a

¹ Solly, "Medical Climatology," p. 214, London, 1897.

central sitting-room. The bedrooms average 10 feet \times 14 feet, the sitting-rooms 18 feet \times 25 feet. The partitions between the rooms are of solid masonry, but those between the bedrooms and the central sitting-room are only 7 feet high, so as to give a larger ventilating space; moreover, the inner doors do not touch the floor. Ventilation is by means of open fireplaces in the central sitting-rooms, and by transoms over the verandahs and small openings over the windows of the bedrooms. The main building is ventilated by open fireplaces and ventilators in the ceiling, which lead by tin pipes to the chimneys. It is also heated by hot water. The cottages are heated by hot water, stoves and fireplaces. The whole sanatorium is lighted by electricity. The buildings are all constructed of hard wood and masonry, with as few angles as possible; the walls being of smooth varnished wood, without curtains or hangings, and the floors of hard wood, without carpets and with as few rugs as possible. Verandahs are placed outside the cottages, with glass partitions on the windy side. There is a stone church in the grounds, in which services are held nearly every Sunday by clergymen of any denomination who may volunteer their services. The sanatorium was founded by Dr. E. L. Trudeau, and is under private management, State aid having been refused. It is directed by a Board of Trustees. The charges cover about three-fifths of the cost. The average length of stay is six months, twelve being usually the limit. Patients showing no improvement after a reasonable time are advised to return home. There is an *industrial settlement* in the neighbourhood for discharged patients, who do gardening, poultry farming, and various handicrafts of a suitable kind.¹

REFERENCE.—Knopf, *loc. cit.*, p. 139; Carrington, *loc. cit.*, pp. 40, 156, 163.

THE GABRIELS SANATORIUM

is *situated* on Sunrise Mount, on land given by Dr. Seward and Mr. Paul Smith, almost surrounded by State lands with thousands of acres of pine trees and the like. This district is on the north shore of the lower St. Regis Lake, a lovely chain of lakes about five miles long, with sandy shores and very little rock. The neighbourhood is comparatively level, with one mountain (St. Regis) about 3000 feet high.² The sanatorium consists of detached houses of two or three

¹ "British Medical Journal," 27 July, 1907.

² Solly, *loc. cit.*, p. 210.



FIG. 4.—THE ADIRONDACK COTTAGE SANATORIUM

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stories, built of hard wood, heated by one central boiler-house about 220 yards from the main building. Pure air is forced into the buildings through a shaft, and heated on its way by radiating pipes. The air can in this way, it is said, be changed every five minutes. There is a complete installation for hydrotherapy. Only early cases are admitted. Both rich and poor are accepted, the fees of the former helping to support the latter. The staff includes a house physician and nursing sisters. The latter receive no personal remuneration.

THE SEAVIEW HOSPITAL,

Staten Island, Richmond, New York, is being built about the centre of the island, three miles from the lower New York bay and about 450 feet above sea level. There are eight ward buildings, arranged in a semicircle, built of concrete and tile with steel frame, of four stories, each floor being provided with a balcony running along about half its length. A semicircular covered walk connects the different buildings. Intersecting this in the centre is a line of administration buildings, with some large rest shelters and a chapel. The power-house, laundry, etc., are at the ends of the semicircle. Another semicircular walk runs beyond the buildings, outside of which are a number of shacks.

The institution was to be opened in April of this year (1913) and to be administered by the Board of Charities.

ST. JOSEPH'S HOSPITAL,

New York, is owned and managed by the Roman Catholic order of the Sisters of the Poor of St. Francis, who also have a number of other hospitals in various parts of Europe and America. It is open to the poor, irrespective of race, nationality or religion, and also admits patients for a small payment into small wards and private rooms. Consumptives in all stages are admitted, but are distributed into different wards according to their stage and condition.

The hospital is situated in the suburbs of the city. It is surrounded by a garden, and looks out on the south and east on to open park grounds. It is a large four-story building, with projecting wings, and contains accommodation for 525 patients. There are a number of large wards containing from twelve to sixteen beds on

each floor, all looking south ; and at the eastern and western ends of the buildings other small wards for from two to eight, and small private rooms for one patient each. The walls are of plaster or covered with glazed paint ; the floors of varnished hard wood. The kitchen and laundry are in a separate wing. Behind the main block is a separate building for incipient and arrested cases of consumption. Farther back are the power-house, stables, and workshops, and to the extreme north-west the mortuary. The water supply, sewerage and gas lighting are connected with the city systems. Besides the garden, small sheltered balconies at the ends of the building are used in all weather for the open-air treatment, but patients are drafted as soon as they are fit to one of the country sanatoria.

THE TUBERCULOSIS PREVENTORIUM FOR CHILDREN, Farmingdale, N.J., is *situated* near Lakewood in the "pine belt". The *grounds* consist of 170 acres of farm land, the *buildings*, four shacks each for thirty-two children, and a reception pavilion for forty more. Children are taken from infected families in the worst parts of New York, and kept for two to six weeks, spending most of their time in the open air. In the meantime the quarters at home are renovated and improved. There is no physician in charge, but several visiting physicians attend.

THE WHITE HAVEN SANATORIUM.

Situation : On a mountain side near the town of White Haven, Pennsylvania, 116 miles from Philadelphia, 1600 feet above the sea level. *Grounds* : 230 acres, consisting of farm land, well protected by higher hills to the north-west.

Buildings : What was originally a farm-house has been converted for administration purposes. The barn was made into a thirty-two bed pavilion, three brick cottages added with each sixteen beds, and thirteen other wooden buildings for patients' quarters, besides the superintendent's cottage, and sundry out-buildings.

The sanatorium was built by the Free Hospital for Poor Consumptives and White Haven Sanatorium Association. Patients are expected to stay until they have been able to work eight hours a day for a month.

CHAPTER XXII.

THE ATLANTIC STATES—SOUTHERN GROUP.

COMPRISING Delaware, Maryland, District of Columbia, Virginia, North Carolina, and South Carolina.

The total accommodation in these States is forty sanatoria and similar institutions, with about 2075 beds. For incipient cases alone there are five sanatoria with 444 beds ; for advanced cases alone four, with ninety-six beds ; two children's sanatoria with sixty-two beds ; one day camp with thirty beds ; and two institutions (in Maryland) for convalescent sanatorium patients, with twenty-eight beds. Seven asylums have a total provision for 352 tuberculous inmates ; three prisons have eighty beds for tuberculous prisoners. There is one open-air school (in the District of Columbia) with thirty-five places.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
DELAWARE—					
Hope Farm, Marshallton	1907	8-12	—	All	33
MARYLAND—					
Md. State San., Sabillas- ville	1908	3½	Dr. Victor F. Cullen	curable	400
‡ * Hosp. for Crippled Chil- dren, Baltimore	1895	var.	Dr. Taylor, Dr. H. W. Kenwood	Surg.	50
Munic. Tub. Hosp., „	1890	F.	Dr. Gordon Wilson	All	200
Jewish Home for Cons. of Baltimore, Reister- town	1908	F.	Dr. Louis Rubin	All	46
Hosp. for Cons., Towson	1896	—	Dr. Martin F. Sloan	I.	50
Eudowood San.	„	—	„	A.	34
„	—	—	—	Conv.	15
Do. Farm Colony	—	—	—	„	13
Starmont San., Washing- ton Grove	1905	10-15	Dr. J. H. Lindsey, Gen. Sternberg	I., M.	35
DISTRICT OF COLUMBIA—					
Tub. Hosp. D. Col., Washington	1908	F.	Dr. W. B. Tewksbury	All	120
† Red Cross D.C., „	1908	F.	—	Amb.	30
San. Benev. and Prot. Order of Elks, Wash- ington	—	—	—	—	—

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
VIRGINIA—					
Virg. State S., Catawba	1909	5	Dr. J. T. Lloyd	I., M.	159
Home Cottage, „	1910	12	„	I.	14
† Tub. Camp, Charlottesville	1907	F.	Dr. R. W. Garnett	M., A.	12
* † Summer Camp Antit. L., Norfolk	1910	F.	Dr. C. R. Grandy	—	12
c. Tub. Pav. City Home, Norfolk	1909	F.	—	A.	30
Birdville San., Petersburg	1911	F.	Dr. W. F. Drewry	All	20
Pine Camp, Richmond	1910	F.	Dr. G. B. Cook	M., A.	20
City Tub. Hosp., Roanoke	1910	F.	Dr. T. D. Armistead	All	16
N. CAROLINA—					
N. C. State T. S., Mon- trose	1908	10	Dr. J. E. Brooks	I.	60
Cottages, Asheville	—	—	Dr. Chas. L. Minor	—	—
„ „ „ „ „ „	—	—	Dr. W. L. Dunn	—	—
St. Joseph's San., Asheville	1910	—	—	—	20
Winyah San., „	1888	30 +	Dr. Karl von Ruck, Dr. S. von Ruck	E., M.	80
Asheville Biltmore S., Biltmore	1908	8-25	Dr. Paul Paquin	E.	35
Cragmont S., Black Mountain	1906	20-35	Dr. I. J. Archer	All	30
Fellowship San. of the Royal League, Black Mountain	1905	7	„	All	25
Pines San., Black Mountain	1901	20-30	Dr. Clyde E. Cotton	I., M.	15
Heidelberg S., Flat Rock	1910	25	Dr. A. R. Guerard	I., M.	50
Dr. Morse's S., Hender- sonville	1908	20-35	Dr. L. B. Morse	I., M.	20
Tudor and Carson Cot- tages, Hendersonville	1910	7-10	Dr. W. R. Kirk	All	30
Highlands Camp S., Highlands	1909	20	Dr. Mary E. Lapham	I., M.	50
Southern Pines S., Southern Pines	1898	15 +	Dr. Edwin Gladmon	All	30
S. CAROLINA—					
Aiken Cottages, Aiken	1896	5 or F.	Dr. H. T. Hall	I.	16

Signs and contractions as in previous table. See p. 118.

THE MARYLAND TUBERCULOSIS SANATORIUM,

Sabillasville, is *situated* on the crest of the Blue Mountains Ridge, sixty-nine miles north-west of Baltimore on the Western Maryland Railway. Rising ground protects it to the north. *Soil*: Sandy. *Altitude*: 1460 feet. *Grounds*: 198 acres, comprising farm lands and woodlands.

Buildings: A large stone administration building and infirmary,

a reception hospital with 200 beds just completed, ten cottages, power-house, laundry, and farm buildings. There is a special railway station, and a post office attached to the sanatorium. The administration building is oblong and of three stories, connected with a subsidiary building behind it, placed at the foot of a hill. Running up the hill at the sides are a number of separate pavilions, one behind the other. These are one-story wooden lean-to shacks with a central two-story portion which projects northwards, forming an inverted T: each contains twenty beds for patients, excepting one for ten convalescents. Each pavilion has an open front forming a deep balcony, the central portion containing a common-room, and behind this a large double dressing-room surrounded with dressing-boxes, bathrooms, etc. The bedrooms are separated by sliding glass and wood partitions from the balcony. Owing to the slope of the ground, each pavilion behind gets a south view over the one in front. The reception hospital is a two-story structure in two parts, with the new kitchen and dining-room attached to the junction.

There are also twenty beds for patients in the infirmary.

Staff: Three resident physicians, a superintendent of nurses, postmaster, chief clerk, chief engineer, etc., with a board of management in Baltimore and examining physicians in various parts of the State. The members of the State Board of Public Works are ex-officio members of the board of management, with seven members appointed by the Governor of the State.

Financial: The original cost was about \$265,000. The new reception hospital cost \$109,281, exclusive of architects' fees and equipment. These have been estimated at another \$77,099. Cost of patients' pavilions about \$7000 apiece. Cost of maintenance \$0.97 per head per day.

Statistics: During 1911, 593 patients were treated, 388 discharged, 395 admitted. Average stay about eighteen weeks.

REFERENCE.—Carrington, *loc. cit.*, pp. 26, 112, 125.

BALTIMORE.

The supervisors of City charities have a Municipal Tuberculosis Hospital with 200 beds under their charge, and in 1911 subsidized twelve beds for incipient cases (whites) in the State Sanatorium, ten

beds for moderate and advanced cases (whites) at the Eudowood Sanatorium, and six beds for incipient and advanced cases (whites) in the Hebrew Consumption Hospital. During 1912 fifty beds were retained at the State Sanatorium for incipient and moderately advanced cases. The time of residence at a sanatorium is decided by the superintendent there, but may not exceed six months.

THE BALTIMORE MUNICIPAL TUBERCULOSIS HOSPITAL

is *situated* just outside the city limits, three miles from Chesapeake Bay, which it overlooks.

Buildings : A large brick two-story building over a basement, with broad roofed and screened porches running the whole length of the south side for open-air beds. There is room for 140 men and 60 women, half for whites and half for negroes. Running back from the centre on the north side is a T shaped portion with deep covered porches on either side. It contains isolation rooms for delirious or dying patients, doctors' and nurses' offices, laboratory, etc. There is also a nurses' home, laundry, kitchen building, and (in course of erection) a separate house for the resident medical officers.

Staff : Three resident and one visiting physician, sixteen nurses and four orderlies (male nurses).

Cost : Per patient in 1912 about fifty-five cents exclusive of interest on capital. Cost of erection about \$60,000.

Statistics : Over 700 patients were treated during 1912.

THE CATAWBA SANATORIUM

is *situated* in the Alleghany Mountains, eleven miles north of Salem, Virginia. *Soil* : Sandy. *Elevation* : 2000 feet.

Buildings : A central kitchen and dining-room with an amusement hall attached. Above the kitchen is a sewing-room from which the meals are sent to the Infirmary through a covered passage.

There are five lean-to's, each accommodating eighteen patients; one with nine beds, and an Infirmary for twenty men and twenty women. Total capacity : Seventy-six beds for women, eighty-three for men.

Staff: Three physicians, seventeen nurses, the head of whom is Superintendent of the Training School.

Arrangements: Preference is given to early cases capable of improvement. There is a two years' course of training in tuberculosis nursing: "undergraduate nurses" (? probationers) are mostly employed. Tuberculin is freely used; and recently artificial pneumothorax in suitable cases. Graduated work will shortly be introduced.

Financial: Cost per head per week \$10.69, of which the State pays \$5.69, the patient the remainder.

THE WINYAH SANATORIUM,

Asheville, North Carolina, was originally founded in 1878 by Dr. J. W. Gleitsmann of New York, remodelled ten years later by Dr. Karl von Ruck.

Situation: Outside the city, in a well-wooded park of twenty-five acres with mountains to the north. *Soil*: Limestone and sandstone. *Altitude*: 2250 feet.

Buildings: A main structure, a large annexe, and two cottages, built of wood, connected by glass-enclosed steam-heated porches and passages. Walls and floors are double, filled in with mortar. There are many balconies, some enclosed by glass, some steam heated. There are many reception rooms. Every room has a fire-place; the building however is heated with air warmed by steam radiators in the basement. Lighting by electricity.

Staff: Dr. Silvio von Ruck and two other physicians in residence. Consultant: Dr. Karl von Ruck. Trained nurses only for special cases.

CHAPTER XXIII.

EAST CENTRAL STATES.

COMPRISING Ohio, West Virginia, Kentucky, Tennessee, Michigan, Indiana, Illinois, Missouri, Iowa, Wisconsin, and Minnesota.

In these States there are 111 tuberculosis institutions with collectively about 5600 beds. For incipient cases, seventeen with 1141 beds; for advanced cases, seven with 786 beds; for children, five with 115 beds; for the insane, twenty with 912 beds; for prisoners, ten with ninety-eight beds. Ohio possesses a day camp with eighty beds. There are six or more open-air schools, with a total of 175 or more places, mostly in Illinois.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
OHIO—					
State T. S., Mt. Vernon	1909	5 or less	Dr. Clayton B. Cox- well	I.	200
District T. S. (5 counties), Akron	1910	—	—	—	80
Branch Hosp. for Cons., Cincinnati	1897	F.	Dr. Chas. S. Rockhill	All	300
D. C. Antit. L., Cleveland Munic. T. S., Warrensville	1910 1906	F. F.	Dr. E. R. Brooks	All I., M.	80 80
Cleveland Munic. T. S., Warrensville	—	—	—	A.	150
* Tent Col. Child. Fresh Air Camp, Cleveland	1908	F.	Dr. R. H. Bishop, Jr.	—	30
T. S. Cleveland City Hosp., Cleveland	1900	F.	Dr. J. D. McAfee, Dr. J. C. Fox	M., A.	100
Franklin Co. T. H., Columbus	1909	F.	—	All	32
Dist. T. H. (2 counties), Dayton	1909	7-10	Dr. Edw. B. Markey	All	24
† Miami Valley Hosp., „	1903	F.	—	All	6
† Natl. Military Home, „ Defiance Co. T. H., De- fiance	1904 —	F. —	Dr. F. W. Roush —	All —	30 —
Jefferson Co. T. H., Steubenville	—	—	—	—	—

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
OHIO cont.—					
Dist. T. H. (5 counties), Lima	1911	F.	Dr. J. W. Costolo	All	28
Lorain Co. T. H., Elyria	—	—	—	—	—
Dist. T. H. (3 counties), Springfield	1910	F.	Dr. Henry Baldwin	All	50
Kleeman Meml. T. C., „	1909	F.	Dr. I. E. Seward	I., M.	16
‡ Lucas Co. Inf., Toledo	1909	F.	Dr. Ab. J. Hammer	A.	16
Lucas Co. T. S., „	1911	—	—	I., M.	60
w. Thalian Fresh Air Camp, Toledo	1910	F.	Dr. Ralph P. Daniells	I., M.	12
Dist. H. (2 counties), Troy	—	—	Dr. Warren Coleman	—	—
‡ m. Mahoning Co. Inf., Youngstown	1908	F.	—	All	14
WEST VIRGINIA—					
State T. S.	—	—	—	—	—
‡ Ohio Co. Inf., Wheeling	—	—	—	All	—
Ohio Co. T. S., „	—	—	—	I., M.	—
KENTUCKY—					
Henderson T. S., Hender- son	—	—	—	—	—
Hazelwood S., Louisville	1907	10	Dr. Dunning S. Wilson	Curable	34
Ouchterlony Hosp., „	—	—	—	—	—
Waverly Hill S., „	1910	3-5 or F.	Dr. S. Wickes Merritt, Dr. D. S. Wilson	I.	40
Paducah T. S., Paducah	1911	F.	—	—	10
TENNESSEE—					
Chattanooga T. S., Chat- tanooga	—	—	—	I., M.	36
Memphis T. H., Memphis	1908	F.	Dr. M. Goltman	All	16
City and Co. T. H., Nash- ville	—	—	—	—	—
Natl. Soldiers' Home	1905	F.	Major J. C. Butler	All	85
Grandview S., Newport	1887	21-28	Dr. J. M. Masters (see Okahumpka, Florida)	I., M.	45
Printing Pressmen and Assist. Union of N. Amer. S., Rogersville	—	F.	—	All	50
MICHIGAN—					
State T. S., Howell	1907	11½ or F.	Dr. Eugene B. Pierce	I.	16
S. of Ass. Prev. R. T., Ann Arbor	—	10 +	Dr. A. W. Hewlett	I., M.	10
Detroit T. S., Detroit	1911	—	Dr. H. A. Shankwiler	All	40
T. H. Bd. of Health, „	1908	F.	Dr. G. L. Kiefer, Dr. V. C. Vaughan	All	75
‡ Wayne Co. H., Eloise	1904	F.	Dr. J. J. Marker	All	24
Munic. T. S., Grand Rapids	1907	10 or F.	Dr. R. Apted, Dr. C. C. Slemmons	All	48
Houghton Co. T. S., Houghton	1911	F.	Dr. W. H. Jackson	—	50
Ionia Co. Tub. Pav., Ionia	—	—	—	—	8
Tub. Colony, Kalamazoo	1909	10	Dr. W. E. Collins, Dr. A. H. Rockewell	All	10

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
MICHIGAN cont.—					
Marquette Co. T. S., Marquette	—	F.	Dr. F. McD. Harkin	—	20
Saginaw T. H.	—	F.	—	—	12
‡ Chippewa Co. Hosp., Sault Ste. Marie	—	F.	—	—	—
INDIANA—					
State T. H., Rockville	1911	F. or 9	Dr. H. B. Leavitt	I.	100
Rockwood T. S., Danville	1907	15-25	Dr. Thos. J. Beasley	E., A.	50
Boehne Farm, Evansville	1910	F.	Dr. J. Y. Welborn	I., A	25
St. Rochus H., Fort Wayne	—	F.	—	All	10
Frankfort T. S., Frankfort	1910	15	Dr. Chas. Chittick, Dr. A. H. Coble	I.	25
‡ Flower Mission Pav. for Incur. City Hosp., Indianapolis	1904	F.	Dr. J. L. Freeland	A.	26
† T. C., "	1909	F.	Dr. J. W. Reed	I.	16
‡ St. Joseph Co. H., South Bend	1909	F.	Dr. C. B. Crumpacker	All	16
T. C., South Bend	1908	F. or 9	Dr. Walter H. Baker	I.	12
ILLINOIS—					
Fresh Air Hosp., Chicago	1910	14-24½	Dr. Ethan A. Gray	All	30
‡ Home for Incur., "	1890	F?	Dr. W. P. Goodsmith	A.	60
Cook Co. T. H., "	1909	F.	—	A.	324
Munic. T. S., "	—	F.	—	—	300
‡ Open Air Pav. Cook Co. Infirm., Chicago	1910	F.	Dr. Ernest S. Moore	—	120
Edward S., Naperville	1907	10 or F.	Dr. Theodore B. Sachs	I.	60
† Tent Colony, Ottawa	1904	18-30	Dr. J. W. Pettit	E.	60
‡ Illinois Sold. and Sailors' Home, Quincy	1911	F.	—	All	15
Munic. S., Rock Island	—	—	Dr. Joseph de Silva and other	—	—
Lake Co. T. Inst. Colony, Waukegan	1908	7-12½	Dr. W. H. Watterson	I., M.	32
Chicago Winfield T. S., Winfield	1908	var.	Dr. Theodore B. Sachs, Dr. S. B. Hirschberg	I.	68
MISSOURI—					
State S., Mt. Vernon	1907	5-12½	Dr. C. C. English	I.	155
Tub. Pav., Kansas City	1909	F.	Dr. E. W. Schaufler	I., M.	22
Munic. T. S., Leeds	—	—	—	—	—
Robt. Koch H., Quarantine	1910	F.	Dr. M. J. Dwyer	All	120
‡ St. Joseph H., St. Joseph	—	F.	Dr. E. S. Ballard	All	5
‡ Jewish Home for Incur. and Cons., St. Louis	—	—	—	—	—
Mt. St. Rose H., "	1902	5-25 or F.	Dr. Louis C. Boisliniere	All	75
‡ * Child. Free H., "	1910	F.	—	Surg.	7
IOWA—					
State S., Oakdale	1908	7½ or F.	—	I.	120
† Ridge Camp, Des Moines	1909	F.	—	All	14
Boulder Lodge S., Fort Dodge	1901	25	Dr. J. W. Kime	E.	25

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
IOWA cont.—					
† Jefferson Co. H.	—	—	—	—	12
† Washington Co. H.	—	—	—	—	12
WISCONSIN—					
State T. S., Wales	1907	5-10 or F.	Dr. J. W. Coon	I., M.	130
Blue Mound S., Milwaukee	1907	10	Dr. G. W. Moorhouse	I., M.	40
Munic. T. H., Milwaukee	—	F.	—	—	40
† * Tub. Ward Child. H., „	1907	7 or F.	—	Surg.	18
River Pines Cottage S., Stevens Point	1906	25-50	Dr. F. E. Walbridge, Dr. T. H. Hay	I., M.	40
Douglas Co. T. H., Superior	—	—	—	—	—
MINNESOTA—					
State S., Walker	1908	7	Dr. L. B. Ohlinger	E.	90
St. Louis Co. T. H., Duluth	1911	7	Dr. W. M. Hart	I., A.	40
Tub. Pav. City Farm, „	1910	F.	Dr. Robt. Graham	All	30
Cuenca S., Gladstone	1910	7	Dr. H. Longstreet Taylor	I., M.	20
(St. Paul Antitub. Assoc.)					
Hopewell H., Minneapolis	1908	F.	Dr. Herbert O. Collins	A.	110
† * Summer Camp Visiting Nurse Assoc., Minneapolis	1908	F.	Dr. C. B. Wright	I.	40
Thomas Hosp., Minneapolis	1908	10-20	—	All	48
Pokegama S., Pine City	1905	16-30	Dr. H. L. Taylor, Dr. E. B. Daugherty	I.	40
† * Eva Shapiro Mem. Camp, White Bear Lake (St. Paul Antitub. Assoc.)	1910	F.	—	—	20

For signs and contractions, see p. 118.

THE OHIO STATE SANATORIUM, MT. VERNON.

This sanatorium comprises a reception hospital, a building for incipient cases, and other structures.

The *reception hospital* is a brick two-story building with tiled roof, and consists of a central section with large day-room and porch, and two wings with 12 feet deep verandahs, bedrooms 8 feet × 10 feet, small dressing-boxes, and 5 feet corridor.

A central rear extension contains rooms for attendants, kitchen quarters, bathrooms and lavatory, etc. Total capacity, twenty-four beds. Cost, \$30,000.

The *building for incipient cases* is also T shaped, and consists of a central living-room, 25 feet × 18 feet, with large bow-window, and wooden wings 24 feet deep containing twenty beds, opening on to

a tiled terrace. Behind the living-room is a short corridor, and beyond this a rear extension with rooms for attendants, diet kitchen, and a large dressing-room projecting on either side, provided with separate dressing-boxes. Cost, \$6500.

REFERENCE.—Carrington, *loc. cit.*, pp. 115, 128.

THE ASSOCIATION SANATORIUM, LOUISVILLE, KENTUCKY.

Consists of administration building, men's pavilion, women's pavilion, and accessory structures, mostly of wood, and of one story.

The men's pavilion has a central sitting-room, with dressing and bathrooms to the rear, flanked on either side by two private rooms, the whole surrounded on three sides by a 12 feet deep verandah. Total capacity, twelve beds.

The women's pavilion has a central sitting-room, with a large dressing and bathroom behind it, and on either side a large dormitory. There is a 9 feet deep verandah along the whole south side, and two shorter ones on the north side.

Total capacity: Twelve beds.

REFERENCE.—Carrington, *loc. cit.*, p. 137.

THE WAVERLY HILL TUBERCULOSIS SANATORIUM, LOUISVILLE, KENTUCKY.

Situation: An estate of 170 acres on a range of hills near Iroquois Park, overlooking the Ohio River. The sanatorium is on the crest of a steep hill, with the administration building on the top, the power-house on the northern slope, and the patients' pavilions between.

The *buildings* are of wood on concrete foundations, covered with cement, with red-tiled roofs. The patients' quarters are for men on one side, for women on the other, connected by means of corridors with the dining-room, which lies between. Between the power-house and the dining-room, attached to the latter, are the kitchen quarters. The administration building is a two-story structure, the patients' pavilions of one story. There is a deep verandah in front and at the sides of the latter. There is also a farm.

REFERENCE.—Carrington, *loc. cit.*, pp. 28, 46.

THE OTTAWA TENT COLONY, ILLINOIS.

Situation : On a wooded bluff 125 feet above the river Illinois, on the light railway communicating with the town, in a picturesque neighbourhood.

Buildings : An administration building and clubhouse provided with open fireplaces and a deep verandah ; a colony of tents, and various accessory buildings, including an annexe for those requiring nursing.

The tents are of various kinds. Some are square, boarded below, of tent cloth above. They are heated in winter by slow combustion stoves. Patients have been able to stand temperatures of 25° below zero without harm in an exceptionally cold winter. There is electric lighting throughout ; and a bath-house for general use. A launch on the river is used in summer.

Staff : Medical Officers : Dr. J. W. Pettit and Dr. Butterfield. Superintendent : Mr. H. V. Pettit ; a skilled lady dietician (graduate in domestic science), a skilled head nurse, etc.

Cost of installation over \$40,000.

CHAPTER XXIV.

WEST CENTRAL STATES.

COMPRISING North and South Dakota, Nebraska, Kansas, Indian Territory, Montana, Wyoming, Colorado, and New Mexico.

These States have forty-five sanatoria or similar institutions with 3027 beds ; of which five with 269 beds are reserved for early cases, two with forty-five beds for the insane, one with twenty beds for prisoners. Fort Bayard, the United States Army Hospital, with its tuberculosis department of 400 beds, and Fort Stanton, the Public Health and Marine Hospital Service Sanatorium, with 250 beds, are in New Mexico. The United States Naval Hospital at Las Animas, with 254 tuberculosis beds, is in Colorado.

There are no open-air schools in this section, though a few are projected.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
N. DAKOTA— State San.	—	—	—	—	—
S. DAKOTA— State San., Custer	1911	F.	Dr. H. J. James	Curable	14
‡ Battle Mountain S., Nat. Home for Volunteer Soldiers, Hot Springs	1909	F.	Col. Jas. E. Miller	All	50
NEBRASKA— State San.	—	—	—	—	—
‡ Douglas Co. Hosp., Omaha	1908	F.	—	—	30
KANSAS— State San.	—	—	—	—	—
‡ Eleanor Taylor Bell Mem. Hosp. Tubercul. Tents, Rosedale	1907	12-15	Dr. George H. Hoxie	All	6
Health Camp Ass. Study and Prev. Tub., Topeka	1910	5	Dr. W. M. Mills	I., M.	11
Sedgwick Home, Wichita	1910	F.	Dr. M. W. Woods	All	6
OKLAHOMA— ‡ City Detention H., Okla- homa	1910	F.	Dr. P. H. FitzGerald	All	20
MONTANA— State T. S.	—	—	—	—	—

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
COLORADO—					
Rocky Mountain Camp, S. Antonito	—	12½	Dr. John Carling	I.	25
Eben Ezer Mercy Inst., Brush	1904	7-12 or F.	—	I., M.	30
Col. Spr. T. S., Colorado Springs	—	—	—	—	20
Cragmor S., "	1907	25	Dr. A. M. Forster, Dr. G. B. Webb, Dr. W. W. Williams	All	30
Glockner S., "	1880	10-35	—	—	175
Modern Woodmen of America S., Colorado Springs	1909	F.	Dr. J. E. White	I., M.	180
Nordrach Ranch S., Colorado Springs	1901	18	Dr. J. E. White, Dr. Geo. Rea	E., M.	60
Star Ranch, in the Pines, Colorado Springs	1910	15-20	—	I., M.	60
‡ Union Printers' Home, Colorado Springs	1898	F.	Dr. D. I. Christopher	All	70
Agnes Mem. S., Denver	1904	9-12	Dr. G. W. Holden	E.	150
‡ Assoc. Health Farm, "	1903	7-8	—	E.	50
‡ The Home, "	1894	6-25	—	All	150
Mrs. Lares' Tent S., "	1901	7-	—	All	33
Natl. Jewish H. for Cons., Denver	1899	F.	Dr. Moses Collins	E., M.	135
S. of Jewish Cons. Relief Soc., Denver	1904	F.	Dr. Hermann Schwatt	All	110
Sunlight S., "	1905	10-25	Dr. M. W. Page	All	20
Swedish Natl. S., "	1906	6 or F.	Dr. John Lindahl	All	25
Evang. Lutheran S., Edgewater	1905	10 or F.	Dr. W. N. Beggs	All	38
Fern Hill S., "	1903	10-35	Dr. C. P. Conroy	I., A.	50
Mennonite S., La Junta	1908	7	Dr. W. M. Moore	I., M.	30
U.S. Naval Hosp., Las Animas	1907	F.	Dr. Philip Leach	All	254
NEW MEXICO—					
Alamo Cottage S., Alamogordo	1908	18	Dr. O. W. Miller	—	10
Alamogordo S., "	1906	15+	Dr. W. R. Saltzgaber	All	60
‡ Albuquerque S., Albuquerque	1909	20-25	Dr. A. G. Shortle	I., M.	35
St. Joseph's S., "	1903	10-25 or F.	—	All	40
S. W. Presbyterian S., "	1908	11	—	All	60
St. Anthony's S., East Las Vegas	1896	9-15	—	All	35
U. S. Army Gen. H., Fort Bayard	1899	7 or less	Dr. G. H. Barber	All	400
Pub. Health and Marine Hosp. Service S., Fort Stanton	1899	F.	Asst. Surg. F. C. Smith	All	250
Laguna S., Laguna (for Indians)	1910	F.	Dr. F. Dillon	All	20
Ranch S., Lincoln	1906	12½-15	Dr. J. W. Laws	All	25

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
NEW MEXICO <i>cont.</i> —					
‡ St. Vincent's S. and H., Santa Fe	—	10-25	Dr. J. H. Sloan	All	75
Sunmount S., „	1907	15 +	Dr. F. E. Mera	E., M.	25
New Mexico Cottage S., Silver City	1905	22-25	Drs. E. D. Bulloch and L. S. Peters	Curable	80
St. Joseph's S., „	1901	25	Dr. O. T. Hyde	„	35
Valmora Industr. S., Watrous	1910	10	Dr. W. T. Brown	—	30

For signs and contractions, see p. 118.

THE AGNES MEMORIAL SANATORIUM, DENVER, COLORADO.

Situation : On grounds of 160 acres within reach of the city of Denver, east of the Rocky Mountains, surrounded by open country.

Buildings : There is an administration building with a number of separate pavilions connected by corridors, and a medical building. The dining-room is in the administration building, the kitchen quarters to the rear of it. There are large solaria leading out of the connecting corridors. The pavilions are of two storys, and have balconies or verandahs on all sides, with a central part containing bedrooms 11 feet × 13 feet in front of and behind a central corridor. The verandah can be curtained off.

Financial : This institution was built for the poorer middle classes with the help of a gift of \$500,000 from Mr. L. C. Phipps of Denver, nephew of Mr. Henry Phipps. There is an endowment.¹

THE HOME, DENVER, COLORADO.

Situation : About ten minutes' ride by tram-car from the city, on an elevation commanding an extensive view over the city, and the plains, to the Rocky Mountains. *Elevation* : 2100 feet above sea level. *Grounds* : Four acres of garden and grass. *Soil* : Sandy.

Buildings : Four substantial buildings united by a corridor used as an open-air lounge. There are sitting-rooms, covered porches and large balconies in every house. Also a music-room, library, gymnasium, etc. The place is most luxuriously furnished and decorated with valuable pictures, rich carpets and all the com-

¹ Carrington, *loc. cit.*, p. 29.

forts of a well-appointed home. Central steam heating; electric lighting; ventilation by fans.

Staff: No resident medical officer.

This institution was founded by the Council of the Episcopal Church of Colorado as a home for Christian ladies and gentlemen of limited means. Certificates of character required before admission.

THE COLORADO SANATORIUM, BOULDER,

is a branch of the Battle Creek Sanatorium in Michigan. It is beautifully situated at the entrance of three cañons to the east of the Rocky Mountains, and equipped with gymnastic, electrical, inhalation and other arrangements, but is not intended exclusively or chiefly for the tuberculous.

THE NORDRACH RANCH SANATORIUM, COLORADO SPRINGS,

is *situated* on the south side of Austin Bluffs close to Palmer Park, at an elevation of about 6000 feet above sea level.

Buildings: A central building of red stone, provided with day rooms, verandahs, patients' bedrooms, and the administrative quarters; and a tent colony with nurses' tent. Each tent is octagonal, with oiled floor and strong frame of wood and iron, and ventilating opening above and below. It is furnished like a room, with the usual bedroom furniture, a closed store, doors, etc. Fires are built up morning and evening in winter. Three chief meals are provided; also milk and eggs three times a day. Temperatures are taken afternoon and evening. The doctor is consulted if necessary morning and evening.

THE GLOCKNER SANATORIUM, COLORADO SPRINGS,

situated on a plateau at the northern end of the city, at an altitude of 6000 feet above the sea level. The surrounding country is mountainous to the west and north, with plains to the east and south. *Soil*: 70 feet of gravel and sand overlying a clay bed which slopes to the south. *Grounds* are small.

The *building* is of brick, with porches and covered balconies on

every floor, some enclosed by glass. Large assembly rooms with fire-places. Central steam heating; electric lighting.

Staff: Managed by sisters of charity, with the help of trained nurses. No resident medical staff.

This sanatorium was built by Mrs. Albert Glockner in memory of her husband. It admits the tuberculous in all stages, but is not limited to such patients.

THE UNITED STATES ARMY GENERAL HOSPITAL,

Fort Bayard, New Mexico, is *situated* in the south-west part of this State, nine miles from Silver City, on the Atchison and Santa Fe Railway. Originally an army post to guard against the Apache Indians, it was converted into a sanatorium in 1899. The land rises on the north over rocky hill country covered with pine woods, to Black Peak, 9000 feet above the sea level, eight miles from the station; while to the south, valleys widen themselves into treeless arid plains. The climate is equable, being warmer in winter than Colorado, cooler in summer than Arizona. The only drawback lies in the strong winds and dust storms during part of the year.

Average rainfall 14·21, chiefly in summer. *Altitude*: 6165 feet. *Grounds*: Originally covered thirteen and a half square miles; but latterly more has been acquired to increase the water supply.

Buildings: These are grouped round the old parade ground. There is a two-story cement brick administration building with offices and quarters for various administrative officers, an officers' club, court-martial room and post office. Another two-story brick building with one-story wings, is used as an Infirmary for advanced and surgical cases. An adjacent building is used for overflow or isolation. The infirmary has sixty-six beds. On the west is the dining-room, seating eighty-five, with kitchen and diet kitchen. Still further west is a receiving hospital with fifty-five beds. To the east is a wooden building with twenty-six beds for elderly ambulant patients unable to stand full exposure to open air. Three large blocks form each a hollow square with central open space, and verandahs inside and out. Each of these will accommodate forty or more patients. The sides of each quadrangle are chiefly employed

as dressing-rooms, while the corners are for administration, recreation, store-rooms and lavatory.

There is also an officers' infirmary, with single-bedded rooms, each with a sleeping porch; a dining-room of one story with seating capacity for 300; an officer's dormitory, a women's infirmary, a laboratory with rooms for radiography, photography, drug store, dispensary and medical library; quarters for officers, a building for female nurses on the western hill; and over two dozen other buildings for officers and civilians employed in the sanatorium. The amusement hall (also used for divine service) will seat 400 persons. The power plant is in a river valley near by.

Staff: Nine medical officers, chaplain, two quarter-masters (one for construction), eighteen female nurses, etc.

Treatment: Hygienic, with much rest and full exposure to fresh air. For a month before departure light labour is imposed.

Patients treated in 1911 = 860.

Terms: Enlisted patients are paid their full pay during residence, and subsistence at the rate of fifty cents per day. Civilians pay \$5 per week; the female dependents of soldiers pay \$0.50 per day.

REFERENCE.—Carrington, *loc. cit.*, pp. 100-102. Report by Dr. Bushnell for 1912.

THE PUBLIC HEALTH SERVICE TUBERCULOSIS SANATORIUM,

Fort Stanton, New Mexico, is intended for patients selected from the twenty-two marine hospitals belonging to the United States, America, which serve the merchant navy.

Situation: Originally an army station, it was taken over in 1895 for use as a sanatorium. It is on an elevated plateau in Lincoln Co., near the Rocky Mountains. About 100 miles north or south are desert lands with mild winters and hot summers; but on the plateau the winters are severe and the summers temperate.

Altitude: 6200 feet. *Soil*: New red sandstone and magnesian limestone covered with alluvium and gravel, light clay on the mesa with here and there some sand. *Rainfall* 17 inches. *Grounds*: Forty-three square miles, consisting of rolling hilly grass land traversed by the river Bonito. Higher up, near the mountains, is a belt of cotton woods and pines. There are 200 acres of cultivated land, of which

10 acres are garden and the rest crops. The sanatorium is self-supporting, and provides most of the food required.

Buildings: About thirty old army buildings transformed for the purpose, and eighty-seven tent houses (or shacks) built of wood, with openings on all sides. There is a central power plant, which provides energy and steam for the kitchens, carpenter's shop, laundry, dairy, pumping stations, sterilizers, ice plant, and heat for seven buildings.

The whole sanatorium is lighted with electricity. Some of the sleeping shelters consist of a naked frame-work of poles with roof and side awnings and six beds. Others have sides boarded up a few feet, and open windows above.

The infirmary will accommodate fifty patients. It has a dining-room attached which seats thirty-five people. The large dining-hall for ambulant patients will hold 200.

Staff: To keep order, two male nurses during the day and a watchman at night. In the infirmary, two trained female nurses assisted by two male orderlies by day, a male nurse at night.

Treatment: Graduated exercise and rest in the fresh air, followed by paid employment for a few months before leaving. Patients are encouraged to settle in the district and devote themselves to sheep and cattle farming, light gardening and agriculture.

Average duration of stay: Seventeen and a half months.

No tuberculin is now used.

REFERENCES.—"Brit. Med. Journal," July, 1904. F. C. Smith, "Public Health Reports Treasury Department, U.S.A.," No. 93.

THE UNITED STATES NAVAL HOSPITAL,

Las Animas, Colorado, is *situated* on the left bank of the Arkansas River, on the Colorado plateau. This region was formerly known as the Great American Desert, but thanks to irrigation is now highly fertile. The sanatorium is seven miles from Las Animas. *Altitude*: 3800 feet. *Grounds*: 600 acres.

Buildings number eighty-five. Separate provision is made for enlisted men and officers respectively, who are further classified on medical grounds.

For enlisted men there are five buildings for ambulant cases with

154 beds, and an infirmary with fifty beds. The latter is a complete hospital with operating room, nose and throat department, commissariat department, and offices. There are special feeding arrangements for the hospital corps, marine guard, and uninfected employés. A well-equipped bakery serves the whole sanatorium.

For officers there are eight cottages of four rooms each and an infirmary of six beds.

An extensive hot-water heating system having about four miles of mains in concrete conduits, serves the whole place. There are two water-works, high pressure pumping stations, and a million gallon reservoir for irrigation and other purposes. The domestic water supply comes from six artesian wells. There is a complete electric installation.

Total cost up to date, \$750,000.

Staff: Two medical officers with a variable number of junior assistants, pharmacist, paymaster, eight hospital stewards, and a number of other employés.

CHAPTER XXV.

SOUTHERN STATES.

COMPRISING Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas.

These States have a total provision of thirty-three institutions with 1576 beds. None are exclusively for early cases, and only one with fourteen beds exclusively for advanced cases.

There are three penal establishments which have made special provision, with 160 beds; and eight asylums for the insane with special provision, in 381 beds.

There are three tuberculosis camps, with seventy-two beds.

There are two open-air schools in Louisiana with 160 places. Texas was the first State to make special provision for its tuberculous convicts.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Director.	Stages Ad- mitted.	Beds.
GEORGIA—					
State T. S., Alto	1911	F.	Dr. E. W. Glidden	—	70
Battle Hill T. S., Atlanta	1911	F.	Health Officer	M., A.	60
‡ Home for Incurables, „	1900	F.	—	A.	14
Dr. Thrash's S., „	1909	25	Dr. E. C. Thrash	I., M.	22
Richmond Co. T. S., Augusta	1909	F.	Dr. Chas. J. Mont- gomery	All	24
Camp Yonah S., Camp Yonah	1907	15	Dr. W. C. Bryant	I., M.	20
Pine Mountain T. S., Pine- dale	1909	13½	Dr. Jesse Monroe Anderson	I., M.	30
FLORIDA—					
State T. S.	—	—	—	—	—
Grandview S., Okahumpka	1887	21-28	(See Newport, Ten- nessee)	I., M.	30
ALABAMA—					
State T. S.	—	—	—	—	—
T. C. Jefferson Co. Antit. Assoc., Birmingham	1910	5 or less	(Dr. Cabot Lull, Dr. H. S. Ward)	I., M.	12

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Director.	Stages Ad- mitted.	Beds.
LOUISIANA—					
Covington T. S., Covington	1904	30	Dr. Wallace J. Durel	All	30
Dr. Ames' T. S., Covington	1909	25	Dr. E. Y. Ames	All	100
Dr. McGehee's Cottage Colony, Hammond	1909	7-35	Dr. E. L. McGehee	I.	24
Camp Hygeia, New Orleans	1908	F.	—	I.	40
‡ State Charity Hosp., New Orleans	—	F.	Dr. J. A. Danna	All	40
ARKANSAS—					
State T. S., Booneville	1910	10	Dr. J. S. Shibley	I., M.	74
TEXAS—					
State T. S.	1912	20-40 or F.	Dr. Bascom Lynn	—	60
Homan T. S., El Paso	1908	25-40	Dr. Robert B. Homan	I., M.	45
‡ Sisters' Hosp. Hotel Dieu, El Paso	1894	—	—	All	50
Texas S. for T., Llano	1903	25	Dr. C. W. Coutant	I., M.	50
San Angelo Heights S., San Angelo	1906	20-25	Dr. F. B. Magruder	All	20
Sunny Crest Bungalow, ,,	1908	17+	Dr. J. D. Brooks	I., M.	20
Tent Colony, San Antonio	1906	20-50	Dr. W. C. Farmer	All	40

For signs and contractions, see p. 118.

THE GEORGIA STATE SANATORIUM, ALTO.

Situation : Two miles from Alto, seventy-four miles east of Atlanta, on the main line of the Southern Railway, on land sloping south-east and fairly well protected by rising ground and forest to the north and west. *Elevation* : 1600 feet. *Grounds* : 257 acres, consisting of an elevated plateau running out into two promontories, and of a lower ridge of hill farther south-west.

Buildings : These form part of a complete sanatorium to consist eventually of about 400 beds, for white and coloured patients in separate portions. Those for the white patients will form two curved lines following the contour of the diverging promontories, with the administration buildings on the flat connecting plateau. Those for negroes will occupy the subsidiary hill to the south, seen across the ravine from the white quarters.

The road enters behind at the north-west corner, and leads to the Reception Hospital, for observation on arrival. Further east are to be three main buildings, for infirmary, administration block, and dining-room respectively. At present the Infirmary is used as a temporary administration building. The patients' quarters are ar-

ranged symmetrically in front of these three buildings. Owing to the slope of the ground everything can be overlooked from the administration building. The patients' quarters are lean-to's for ten to sixteen patients each, consisting of a pair of dormitories in front and two dressing-rooms with dressing-boxes behind forming a sort of corridor, a lavatory pavilion projecting to the north. The negro quarters will have a separate service building, and will be hidden by trees and shrubs from the white quarters, but will be similarly planned.

REFERENCE.—Carrington, *loc. cit.*, pp. 27, 113, 129.

THE TEXAS STATE TUBERCULOSIS COLONY,

Carlsbad, Tom Green County, is *situated* in mountainous country on the banks of the North Concho River, on the south side of the Indian Mountain. *Altitude*: 2100 feet.

Buildings: Seven fireproof concrete buildings. It is proposed to extend the accommodation to 180 beds. Half is reserved for indigent patients, the remainder for those who pay either \$5 or \$10 per week.

Cost of maintenance with eighty patients: \$42.80 per day.

CHAPTER XXVI.

THE PACIFIC STATES.

COMPRISING Alaska, Washington, Oregon, Idaho, California, Nevada, Utah, and Arizona.

These States have forty-nine institutions admitting tuberculous patients, with 1377 beds. Two, with thirty-four beds, are for prisoners ; two, with 136 beds, for the insane ; two, with forty-two beds, are exclusively for advanced cases ; three are tuberculosis camps, with thirty beds. There is one open-air school in this region, with twenty-five places. The Pacific Branch National Home for disabled volunteer soldiers is in California.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Director.	Stages Ad- mitted.	Beds.
ALASKA— ‡ Presbyterian Hosp., Haines	1907	F.	Dr. C. W. Presnall	All	10
WASHINGTON— T. C. Whatcom Co. Antit. L., Bellingham	1910	F.	Dr. E. C. Ruge	—	10
Walter W. Henry Mem. S., Seattle	1911	—	—	All	40
‡ King Co. Hosp. Tub. Ward, Seattle	1903	F.	Dr. W. H. Corson	—	40
Pulm. Hosp., City of Seattle	1910	10-25	Dr. A. L. Cook	I.	32
OREGON— State T. S., Salem	1910	F.	Dr. P. H. FitzGerald	All	50
Salem Indian School S., Chemawa	1909	—	Dr. C. D. Fulkerson	—	25
Open Air S., Portland	1905	15-35	Dr. Marion Hober, Dr. E. A. Pierce	I., M.	40
Multnomah Co. Prev. Farm, Portland	1908	F.	Dr. E. P. Geary	All	24
IDAHO— Fort Lapwai S., Lapwai (for Indians)	1910	F.	Dr. J. N. Alley	All	45

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Director.	Stages Ad- mitted.	Beds.
CALIFORNIA—					
White Crusaders S., Alta	1909	15-25	Dr. B. F. Howard	I., M.	35
Dr. King's S., Banning	1909	15	Dr. J. C. King	All	15
Cal. S. for Tub., Belmont	1910	30+	Dr. Max Rothschild, Dr. Agnes Walker	I., M.	50
Colfax School for the Tub., Colfax	1908	18-25	Dr. R. A. Peers	E., M.	50
Arequipa S., Fairfax	—	—	Dr. P. K. Brown	—	20
Barlow S., Los Angeles	1902	5 or F.	Dr. W. J. Barlow, Dr. R. L. Cunningham	E., M.	44
Highland Park S., "	1910	15-30	Dr. Neil Trew	I., M.	25
‡ Kaspere Kohn Hosp. and Training School, Los Angeles	1910	F.	Dr. H. H. Lissner	All	10
‡ City and Co. Hosp., Los Angeles	1888	F.	Dr. C. H. Whitman, Dr. J. M. Duns- moore	A.	120
Pottenger S., Monrovia	1903	32½-52½	Dr. F. M. Pottenger, Dr. J. E. Pottenger	Curable	100
Needles Cottage S., Needles	1908	40	Dr. Chas. A. Shepard	I., M.	24
‡ King's Daughter's Home for Incurables, Oakland	1897	8	Dr. A. S. Kelly	A.	12
La Vina S., Pasadena	1909	7 or less	Dr. H. B. Stehman	—	35
w. Martyn S., "	1909	30	Dr. George Martyn	E.	20
Mentona S., Redlands	1901	15-35	Dr. G. G. Moseley	All	30
Box Spring S., Riverside	—	—	—	—	30
‡ City and Co. Hosp., San Francisco	—	F.	Dr. W. R. Derr	All	150
Diggins S., "	1909	25	Dr. E. A. Diggins	All	6
‡ Santa Clara Co. Hosp., San Jose	1911	F.	Dr. J. Clark	All	26
Alameda Co. Inf., San Leandro	1903	F.	Dr. W. A. Clark, Dr. E. von Adelung	All	72
El Reposo S., Sierra Madre	1909	15-35	Dr. G. S. Wells	All	60
‡ Pacific M. Natl. Home for Disabled Volunteer Soldiers	1890	F.	Dr. O. C. McNavy	All	50
† Red Cross T. C., San Joa- quin Co., Stockton	1909	4	Dr. M. Goodman	I., M.	14
ARIZONA—					
E. Farm S., Phoenix (for Indians)	1909	F.	Dr. E. A. Marden	All	50
Hanwood Home, "	1911	12	Dr. H. A. Hughes	All	30
Maricopa Hosp., "	1909	F.	"	A.	30
‡ St. Joseph's Hosp., "	1893	16-20	—	All	35
St. Luke's Home, "	1907	12-18	—	I.	35
Pamsetgaaf, among the Pines, Prescott	1903	25-40	Dr. J. W. Flinn	Curable	18
Arizona Health L. Open Air Camp, Tucson	1909	F.	—	Amb.	8
‡ St. Mary's Hosp.	1900	15	—	All	30
Fort Apache T. C., Whiteriver (for Indians)	1910	F.	Dr. H. V. Hailman	All	10

THE PORTLAND OPEN-AIR SANATORIUM, OREGON.

Situation : Six miles south of Portland, 300 feet above the river Willamette, on eleven acres of ground, in a grove of evergreens.

The *buildings* consist of an administration building and a number of cottages, each for one or two persons, arranged around two open courts, and a social hall. The climate is so mild and dry that there is no need to heat bathrooms and dressing-rooms. The amusement pavilion (or social hall) has an open front, and windows on all other sides. The cottages are of wood on stone piers, roofed with stained shingles. The floor is raised $2\frac{1}{2}$ feet above the ground, the interval being covered with lattice work. The interior (16 feet by 13 feet) contains a bedroom, bathroom, a little hall and two closets. The bedroom has a closed stove, and is panelled with hard wood. There is an air space between the ceiling and the roof.

REFERENCE.—Carrington, *loc. cit.*, pp. 31, 43, 160.

THE POTTENGER SANATORIUM, MONROVIA, CALIFORNIA.

Situation : On the southern slope of the Sierra Madre Mountains, in the midst of orange groves and vegetation of a semi-tropical nature, thirty miles from the Pacific Ocean and sixteen from Los Angeles. The sanatorium overlooks the San Gabriel valley to the south.
Grounds : Forty acres. *Altitude* : 1000 feet.

Buildings : A stone administration building with twenty beds for patients on the upper floor, the rest being received in well-planned bungalows, consisting of a sleeping-room and dressing-room, or in tents. Three sides of the sleeping-room are open, being protected by wire screening. Throat department ; laboratory. Central heating ; electric lighting.

Staff : Two physicians ; trained nurses, etc.

REFERENCE.—F. M. Pottenger, "The Diagnosis and Treatment of Pulmonary Tuberculosis," London, 1908, pp. 218-220.

CHAPTER XXVII.

THE AMERICAN COLONIES.

COMPRISING Porto Rico, Hawaii, and the Philippines.

In Porto Rico there is a sanatorium for incipient cases with fifty-five beds. In Hawaii there is a home for all classes with thirty-six beds. In the Philippines there is a prison with 200 beds for the tuberculous; a home for advanced cases with fifty beds; one for incipient cases with twelve beds; the total provision being four institutions with 392 beds.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Stages Ad- mitted.	Beds.
HAWAII— ‡ Leahi Home for Incur., Honolulu	—	10½ or F.	Dr. A. N. Sinclair	All	36
PHILIPPINE ISLANDS— T. S. Bureau of Health, Baguio	1910	F.	Dr. V. G. Heiser, Dr. F. W. Vincent	I.	12
† San Juan T. C. Bureau of Health, Manila	1910	2-6 or F.	Dr. V. G. Heiser, Dr. W. E. Musgrave and Dr. Arturo Garcia	I., M.	130
‡ San Juan de Dios City Hosp., Manila	1911	F.	Dr. V. G. Heiser	A.	50
PORTO RICO— Open Air S. of Antit. L., San Juan	1907	F.	Dr. Pedro G. Igara- videz	I.	55

For signs and contractions, see p. 118.

SECTION II.—SOUTH AND CENTRAL AMERICA AND THE WEST INDIA ISLANDS.

CHAPTER XXVIII.

THE ARGENTINE REPUBLIC—BRAZIL—ECUADOR—URUGUAY—CUBA.

Argentine Republic.

AN anti-tuberculosis league was started in this republic in 1899. There has been great progress in enforcing sanitary measures. Since 1904 it has been illegal to place tuberculous patients in the general wards of hospitals.

There are four institutions for the reception of tuberculous patients ; a sea-coast sanatorium opened in 1893 at Mar del Plata for 150 children of both sexes ; an isolation hospital opened in 1901 at Muñiz ; a tuberculosis pavilion for women at the Rivadavia Hospital ; and Dr. Tornú's Municipal Sanatorium for 100 men, opened in 1904. The three latter institutions between them have 400 beds.¹

There were three dispensaries in 1908, Dr. Rawson's (est. 1903), and those of Dr. Fernandez and Dr. Tornú.

THE DR. TORNÚ MUNICIPAL SANATORIUM

is situated in the high suburbs of Buenos Aires at Villa Ortúza. It is a fine building consisting of pavilions running from north-west to south-east, connected by a covered gallery. At each end is a large hall or solarium with ceiling of plaster and sides of coloured glass ; one of these halls is used as a dining-room, the other as a recreation-room. Each of the wards has twenty-four beds ; they rest on arches one metre above the ground level ; ceilings are oval with openings for exit of air at the top and in the middle ; walls are

¹ "Int. Congress Prev. Tub.," Washington, 1908.

enamel-coated to a distance of two metres from the floor; floors are of Venetian mosaic. There are wide windows with fanlights at the top. Intersecting corridors run to four separate rooms in each pavilion for lavatory, bathrooms, consulting- and waiting-rooms. There is a separate administration building, and a separate kitchen department, both connected with the main building by covered corridors.¹ Disinfection by steam.

Brazil.

Anti-tuberculosis Leagues are now in existence in São Paulo, Rio de Janeiro, Minas Geraes, Pernambuco and Bahia. Great improvements have been effected in sanitary measures, and a corresponding reduction in tuberculosis mortality. It is forbidden by law to receive tuberculous patients in the general wards of hospitals; and advanced cases are now received in separate infirmaries and special hospital pavilions in many of the towns. A hospital was being built in 1909 at Rio de Janeiro for this purpose.²

A pavilion will shortly be opened at Santos, and another is projected for tuberculous maternity cases at São Paulo. A popular sanatorium was about to be opened in 1910 at Piracicaba (São Paulo) six hours by rail from the capital, and another at Fortaleza, the capital of Ceara, as an annexe to the Mendicants' Hospital. A marine sanatorium for children was also to be erected at Leblond near Rio.³ A model sanatorium and model village are being erected with the aid of Government at Campos de Jordao, 1150 metres above sea level, near a chain of mountains, in a place which is said to have a climate like that of the Swiss mountains. It is primarily intended for tuberculous soldiers and sailors. A railway is to be laid down from Loréna, eight hours by rail from the capital.⁴

Dispensaries have been established for the treatment of tuberculosis at Rio, São Paulo, Juiz de Fora, Recife and Campos. There are also holiday homes and open-air schools in several places. A farm two hours by rail from Rio has been acquired for the reception

¹ "Trans. Int. Tub. Congress," Washington, 1908.

² Berlin Anti-tuberculosis Conference.

³ Brussels Anti-tuberculosis Conference.

⁴ Int. Tub. Conference, Rome, 1912; "Tuberculosis," July, 1903.

of children of both sexes of poor tuberculous parents, in connexion with the model Clemente Ferreira Dispensary at Rio. A children's department has recently been added to this dispensary.¹

Ecuador.

There is a fine sanatorium (San Rocafuerte) in this country, founded by the Olmedo Charitable Association in 1900, in the Faldas of Pichincha, at a cost of \$500,000. It forms a semicircle with ten radii, each consisting of a ward with twenty-four beds. There is a communicating gallery on arches which unites these pavilions on the first floor. In the central part of the semicircle is the administration block with bathing establishment. Gardens surround the pavilions.

A railway across the mountains has been constructed to give access to the sanatorium.²

There is an Anti-tuberculosis League at Quito.

Uruguay.

A league for the prevention of tuberculosis was founded some years ago (before 1905). There are many dispensaries in various towns in this country, including three in Monte Video, one each in Minas, Treinta-y-Tres, Salto, Paysandu, and San José. The model sanatorium in Monte Video cost \$33,363. A donation of \$300,000 was made by an anonymous benefactor in 1908 for the erection of sanatoria.³

Cuba.

Two sanatoria for consumptives were projected in and near Havana during the American occupation in 1902. One section was to be attached to a military hospital on the outskirts of the town, and to be devoted to incurables. The other was to be about five miles out in the country, for presumably curable cases. Negotiations were in progress in May, 1902, for the purchase of an estate of 100 acres for this purpose. The prime mover was Major W. C. Gorgas, chief sanitary officer of Havana; the sanatorium was to be supported by the Cuban Government, and to be free for those unable to pay their way.

¹ "Tuberculosis," September, 1912.

² Carlo D. Saenz, "Trans. Int. Tub. Congress," Washington, 1908.

³ Dr. Joachim Salterain, "Trans. Int. Tub. Congress," Washington, 1908.

SECTION III.—AUSTRIA-HUNGARY, THE BALKAN STATES, AND GREECE.

CHAPTER XXIX.

AUSTRIA-HUNGARY.

MUCH has been done of late in combating tuberculosis. The several local Associations for Prevention of Tuberculosis were combined in 1911 into one Central Association. A number of new sanatoria have been built. Dispensaries have been established in all the chief towns and cities of the empire. In Hungary alone there are twenty-eight in existence, and twenty-two more are being prepared, in addition to convalescent homes, and forest schools for children. Heliotherapy in the Austrian Alps has attracted some attention of late as a remedy for surgical tuberculosis. There is a very well-equipped and complete Lupus Institute in Vienna.

THE AUSTRIAN EMPIRE.

Name and Locality.	Opened.	Terms in fl. per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
AUSTRIA—					
Alland Sanatorium	1897	7-17½	Dr. J. Sörgo	—	108†
Wienerwald „	1904	—	Dr. Kraus	—	60
Alland Children's San.	1909	—	—	—	104
Grimmenstein „	—	—	—	c., S.	—
BOHEMIA—					
Tannwald Sanatorium	1902	—	—	m., w.	30
Reichenberg „	—	—	—	—	—
Zwickau „	1910	—	—	c.	—
Nat. Help Assoc.	—	—	for scrofulous and tuberculous	c.	220
Senftenberg Sanatorium	—	—	—	—	106
Beneschau Dist. Hosp.	—	—	curable cases	—	60
Jung Bunzlau „	—	—	incurable cases	—	—

† Being enlarged.
(160)

Name and Locality.	Opened.	Terms in fl. per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
BOHEMIA cont.—					
Prague Pavilion	in con.	—	Incurable cases	A.	—
Prague Sanatorium	"	—	Curable cases	E.	—
K. Franz Josef Jubilee San., Ples	1910	—	—	—	—
GALICIA—					
Zakopane Sanatorium	—	—	Dr. Dluski	—	229
Niepolomice "	1910	—	—	—	—
Lemberg "	1910	—	—	men	26
Galicja and Styria "	proj.	—	—	men	—
" "	"	—	—	w.	—
HUNGARY—					
Marilla Völgy Sanatorium	—	12-20	Dr. Hoffenreich	—	—
Feketehegy "	—	10	Dr. Bartsch	—	175
Uj Tatra Füred "	1876	10-15	Dr. von Szontagh	—	215
Stoosz "	1883	10	Dr. Czirfusz	—	110
Keresztenysziget "	1894	12	—	—	70
Szentendre San., Buda- pest	1896	—	Dr. Wilh. Friedrich and Dr. A. Weiss	E.	25
K. Elisabeth San., Buda- pest	1901	5	Dr. Paul Scharl and Dr. Orszag	E., m. E., w. E., c.	128 90 22
San Stefano H., Budapest	1905	—	—	A., S.	—
Baja H., "	—	—	—	A., S.	—
St. Johann H., "	1908	—	—	A., S.	—
" "	in con.	—	—	A.	400
Kolozsvár H.	—	—	—	A.	—
Josef San., Gyula	1907	5-9	Dr. Josef Geszti	E., m. E., w.	77 57
Algyógy Sanatorium	1908	2·70-3·50	Dr. Karl Mouks, Dr. Genersich; for Iron workers	E., m.	100
Augusta San., Debresin	in con.	—	—	m.	150
Almádi Sanatorium	—	—	—	c.	—
Middle Class San., Buda- pest	in con.	10-12	Under the muni- cipality	—	150
SILESIA—					
Oberschar Sanatorium	in con.	—	—	—	—
STYRIA—					
Hörgas Sanatorium	in con.	—	—	m.	100
Graz "	—	—	—	—	—
Alpenheim San., Aussee	—	—	Dr. Schreiber	—	25
Aflenz Sanatorium	—	—	—	—	—
Neumarkt Con. H.	—	—	—	E., w., c.	—
" San.	proj.	—	—	w.	—
TYROL—					
Gries Sanatorium	1901	14-21	Dr. Malfér, Dr. Nazar- kiwicz	m., w.	—
S. Pancratius "	1902	—	Dr. Paul Fischer	—	49
Kurhaus Meran	—	—	—	—	—
Surgical San., Brixen	proj.	—	—	c. S.	—
" "	"	—	—	m., w.	—

Contractions: A = advanced cases; E = early cases; S = surgical cases;
m = men; w = women; c = children.

Austria.

THE ALLAND SANATORIUM

is *situated* in the Wienerwald about sixteen kilometres to the west of Baden, twenty-seven kilometres from Vienna, in a valley sheltered by mountains to the east, north-east, and north-west. *Grounds* : seventy-six and a half hectares, consisting of woodland, meadows and cultivated land in about equal proportions. The lowest point is thirty metres below the sanatorium, the highest 250 metres above it. *Soil* : Limestone with some clay. *Altitude* : 430 metres. *Stations* : Schwefelbad, Altenmarkt or Weissenbach ; the latter are three-quarters hour's drive from the sanatorium, the former one and a half hours'.

Buildings : A main mass separated by a small hill from the engine house and various other subsidiary buildings which form two groups to the east.

The main block of four stories has day rooms, chapels (one Jewish), committee rooms, and nursing quarters in the basement, wards and a central day room on the ground floor (fig. 5), and a similar arrangement on the upper floors. Each end of the building has places for resting on the south side and sanitary arrangements on the north side. A small northward projection contains the doctors' quarters and main staircases. The large dormitories, with eight beds apiece, are four on each floor. Smaller rooms with two beds apiece are placed next the centre. The floors are mostly covered with linoleum on plaster of Paris, others being paved with terrazzo or tiled. Walls whitewashed. Electric *lighting* ; central low pressure steam *heating*, with an electric heater for hot water on each floor for use at night. *Cubic space*, 40-45 cubic metres.

The dining-room is in a separate building to the east, connected by a covered corridor. Next the dining-room are the kitchen and women servants' quarters. The chief medical officer has a separate villa. The steam laundry, laboratories and mortuary are also separate. This sanatorium has recently been considerably enlarged (Int. Tub. Cong., 1912).

Staff : Five nurses.

Cost : The site is said to have cost 62,000 fl., the various build-

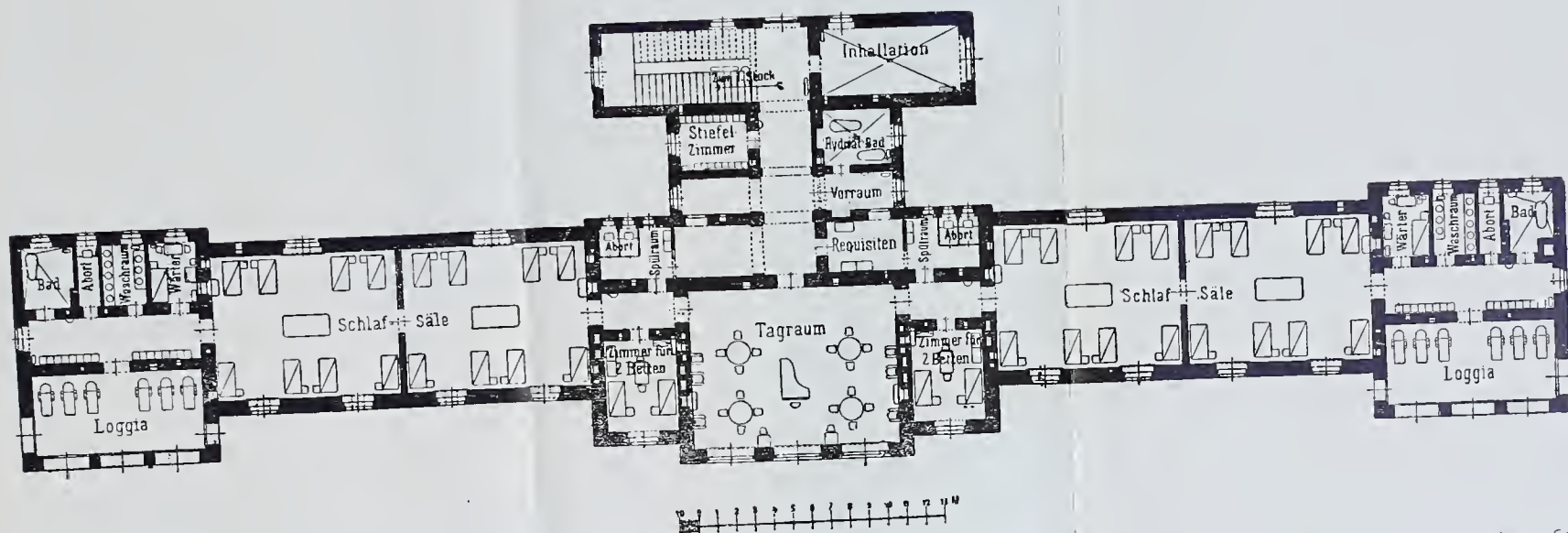


FIG. 5.—THE ALLAND SANATORIUM—GROUND FLOOR

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ings nearly 362,000 fl., and the water supply (which had to be obtained from the other side of the hill) 18,000 fl.

REFERENCE.—S. A. Knopf, *loc. cit.*, p. 128.

THE WIENERWALD SANATORIUM.

Situated in a side valley of the Piestingtal two and a half hours by rail from Vienna. It is surrounded by woodland, being sheltered from the north, open to the south. *Altitude* : 550 metres. *Grounds* : 70 joch (99½ acres).

Building : Of four stories, with the dining-room behind the eastern end and near it the doctors' quarters, and on the next floor some common rooms. There are sixty bedrooms, nearly all on the south side. They mostly have balconies, and are provided with double doors and linoleum-covered floors. Central steam *heating*. Electric *lighting*. A lift runs up to the third story. The kitchen quarters are in the basement of the eastern wing. The rest shelters are outside the building. There is a separate engine house.

Medical Director : Dr. Kraus.

REFERENCE.—"Zeitschr. f. Tuberk.," 1904, VI. 1, p. 452.

Bohemia.

THE TANNWALD SANATORIUM,

Gablonz, was the first popular sanatorium built in Bohemia by private subscriptions and maintained by the local treasury.

Situation : In a cross valley of the Desse, on an eastern spur of the Isergebirge. It is connected with the K. Franz Joseph Hospital.

Galicia.

ZAKOPANE SANATORIUM.

The village of Zakopane in the Tatras chain of the Carpathians has a great reputation as a health resort for consumptives, enjoying a very dry atmosphere and plenty of sunshine. Three kilometres uphill from the village is placed the sanatorium, in a dominating position overlooking the valley, on a private estate surrounded by pine woods. *Altitude* : 1050 metres.

The *building* is shaped somewhat like Hohenhonnef, with wings at obtuse angles. The ground floor is occupied by vestibule, office,

cloak-rooms and those for the staff. The four upper floors contain seventy-two patients' rooms, for one or two patients, all on the south side, the north of the corridor being occupied solely by servants' rooms, W.C.'s and bathrooms. There are one large and two small dining-rooms, a chapel, consulting rooms, laboratory, surgery, operation room and hydropathic department. An electric lift, electric bells and speaking tubes serve every floor. The place (including lift and staircase) is *heated* with low-pressure steam; hot and cold water are laid on at every floor; *lighting* is by electricity. The bedrooms have double doors, linoleum on the floors, model furniture, washable walls and a large verandah or balcony on every floor. Being enlarged.

REFERENCE.—"Zeitschr. f. Tuberk.," July, 1903. International Tuberculosis Conference, Rome, 1912.

Hungary.

THE SZENTENDRE SANATORIUM

was opened in 1896 by the Budapest Workmen's Sick Fund with fifteen beds, subsequently enlarged to twenty-five. A large sanatorium with 200-250 beds is now planned.

Situation of the present sanatorium: on the banks of the Danube, within easy reach of the Capital by railway. The grounds (16,000 sq. klafter)¹ are thickly wooded with fir and other trees.

The *building* contains seven wards. A laundry and disinfectory are attached to the sanatorium. Usual stay: four to eight weeks.

THE QUEEN ELISABETH SANATORIUM,

founded and maintained by the Budapest Sanatorium Association, is *situated* to the west of Budapest, in a valley overlooking the village of Buda Keszi, about nine miles by road from the city. It is sheltered by the Johannisberg and surrounded on three sides by woodland. *Grounds*: 28 acres, fall rapidly to the south-west. The part to the north-east and to the west is covered with oak trees; towards the south is a natural clearing which has been planted as a garden. *Altitude*: 350 metres. *Soil*: loam.

Buildings: The main building, of stone with green verandahs and red-tiled roof, has a straight front with projecting towers at the

¹ About 14 acres.

sides. Between these on the south side are rest galleries on the ground floor, first floor and second floor, supported by iron pillars given by the State. Behind the rest galleries are the chief wards in a single row; behind these the corridor. There are on the first floor six wards with each six beds, two with five apiece, one with two and one extra room. The single and double-bedded rooms are beyond the projecting towers and have a separate balcony. The arrangement is similar on the second floor. To the north of the corridor is a central projection containing the W.C.'s on one side, the common lavatories on the other. Next the W.C.'s are rooms for disposal of sputum; also receptacles for dirty handkerchiefs and papers respectively. In the common lavatory each patient has a numbered basin, and a numbered glass shelf for the utensils. There is a separate opening for the water used in cleaning the teeth. The small wards have separate lavatories. The laboratory and rooms for assistant medical officer with separate bathrooms are also to the north. The entrance is on the ground floor at the western end. Next to it are the cloak-rooms, where each patient has two lockers for indoor and outdoor boots and clothes respectively. Close by on the ground floor are the consulting rooms and small dental and operation rooms. Leading northwards is a closed well-ventilated corridor to the dining-room, which is in a separate building; the staircase is close by, with rounded stone steps. Farther along the ground floor are two separate day-rooms, the electric lift, and three wards each with six beds. Behind the corridor is a verandah where clothes may be brushed.

The western tower has an additional story; and over the whole building are attics. These are for servants' quarters. The eastern end has on each floor a nurses' room; and in the basement a very complete hydropathic installation. *Heating* is by low-pressure steam, the pipes brought through a tunnel from the engine-house, and the radiators placed on the north side of the wards. *Lighting* is by electricity, a number of wall plugs being placed in the rest galleries. For ventilation each ward has a shaft, two large and one small window, and fanlights over the doors.

Floors are mostly of a special brown Hungarian patent asbestos resembling *torgament* (see p. 30). In the corridors this is

coloured to resemble carpet. Corners are everywhere rounded. Walls are painted with enamel paint to 1·80 metres above the floor. In the wards are iron pedestals with glass tops; each bed has washable bedding, a linoleum strip on the floor, a chair, paper basket and table beside it. The clothes lockers are in the corridor and have high feet and sloping tops. The cane lounges in the rest galleries are provided each with horse-hair mattress and bolster.

Next the dining-room is a lavatory, and a cupboard with numbered places for the serviettes. In front of the building is another rest gallery with a glass partition.

There are two rooms for medical visitors.

The laundry and engine-house are to the north-east, behind a group of trees. The chief medical officer has a villa on the entrance drive.

REFERENCE.—“*Zeitschr. f. Tuberk.*,” April, 1903.

THE JOSEPH SANATORIUM

is *situated* near Gyula, in the forest of Lugos, on the great Hungarian plain. It is near the banks of the River Fekete-Körös, and is surrounded by extensive forests. There is a special railway *station* on the line from Nagyvárad to Szeged. *Grounds*: 30 joch,¹ of which two-thirds consist of oak woods. Two large orchards, etc.

The *buildings*, of two stories, consist of a central portion surmounted by a tower, connected by curved rest galleries with two wings, together forming a semicircle, a doctor's villa, stables and other outbuildings.

The central portion contains the reception-room, directors' offices, two X-ray rooms, hydropathic installation; above this the chemical and bacteriological laboratories, and farther on an ante-room communicating with the dining-room. North of the latter is the kitchen department. The wings contain wards with from one to six beds apiece, the majority containing six. These have a corridor to the north, and a deep verandah to the south. One wing is for women, the other for men. Behind that for the men is a separate block of twenty beds in two wards. At the junction of the wing with the connecting rest-shelter are cloak-rooms, nurses' rooms,

¹ About 42½ acres.

and a sitting-room. The wards have about 30 cubic metres space per bed, red dolomite pavement with rounded angles, enamelled cream-coloured walls covered with life-size paintings, furniture consisting of iron spring bedsteads, a pedestal covered with glass, chairs and a table, and in the one and two bedded rooms a washstand. Beside the bed is a light blue carpet strip. In the annexe the lavatory arrangements are in the northern corridor; in the other portions there are separate lavatories. Lighting is by electricity, heating by low-pressure steam. The radiators are on the north side of the wards. Ventilating shafts are placed behind them, leading above the roof. Above the lavatory basins are glass brackets for the toilet articles. The clothes lockers are in the corridors. The chairs in the rest-galleries are of iron with wire springs and adjustable backs.

The managers' quarters, nurses' quarters, laundry and disinfecting apparatus, form part of the kitchen block.

There is an elaborate system for purification of the sewage. The soil pipes and water pipes are open to inspection where they pass through the buildings.

Staff: Three resident physicians, six religious and one lay sister.

THE ALGYÓGY SANATORIUM,

built for the Royal State Ironworks in Algyógy (Eastern Hungary), is sheltered by mountains to the north, and surrounded by an extensive oak forest.

It contains 100 beds, for men only, in two-bedded verandah rooms. *Heating* by low-pressure steam; *lighting* by electricity.

It is primarily intended for the workmen of the State Ironworks; but so far as there is room, it also receives the workmen and employés of the Royal Hungarian State Railways, and after them the workmen from the private ironworks. The first group pay 2 kr. 70, the others 3 kr. 50. The families are maintained during the absence of the bread-winner.

Staff: Two physicians; Red Cross sisters.

Financial: cost 1,130,700 kr. Cost of maintenance in 1913: 178,000 kr., of which 98,000 was paid by the patients, the rest by the management of the Ironworks.

THE AUGUSTA SANATORIUM

is also being built, like the Joseph Sanatorium, in the great Hungarian plain. It is near Debresin, which town gave the ground and a sum of 200,000 kr. towards the cost of erection.

Placed in the midst of a large forest, the sanatorium is connected with the town by an electric tramway.

The *building* will be of two stories with rest galleries on either side. The ground floor of the right wing will contain twenty beds, one or two in a room, for those paying higher fees. These patients will each have a private sitting-room.

In the left wing will be rooms for the management, physicians, hydropathic installation, etc. To the north of the corridor which runs the length of the building, will be laboratories, X-ray room, dark room, operation room, and at the north-western corner of the right wing, the nurses' rooms, bathrooms, cloak-room, closets, and disinfecting rooms. The dining-room, with lavatory attached, is near the main entrance. It has a removable glass partition on the eastern side, and opens on to a terrace for use in summer. A smaller dining-room is intended for the patients paying higher fees. The kitchen department is to the north of the dining-rooms.

The wards are to be arranged in four groups, differing in the number of beds to a ward, the largest number being eight, and those with fewer rooms being reserved for the more severe cases of illness, and provided with separate small balconies. Each group will have its own lavatory arrangements, only the rooms for those paying higher fees having separate washstands. *Cubic space*: 28·5 cubic metres. Floors in the wards covered with linoleum over cork; in the corridors granite, on the terraces polished "beton". All corners rounded. Walls covered with enamelled life-size paintings, or where necessary with tiles. Wardrobes built into the walls.

There will be sitting-rooms between the higher price and the lower price rooms. The quarters for the assistant physicians will lead off the north side of the corridor. In the basement will be the quarters for servants and lay staff, store-rooms, and rooms for dirty linen.

Heating by low-pressure steam; *lighting* by electricity.

Estimated *cost*, including furniture, 1,200,000 kr., or 8000 kr. per bed.

Tyrol.

THE GRIES SANATORIUM.

Opened in 1901, enlarged in 1908 and 1911. It was the first private sanatorium to be opened in Austria.

Situation : Immediately to the south of the Guntschnaberg, a mountain of porphyry, and overlooking the valley of the Etsch, in the midst of vineyards. The place is said to be the mildest winter station in Austria. It lies near Bozen, between Innsbruck and Verona, not far from Meran. *Altitude* : 275 metres. The *grounds* are planted with palms and other southern vegetation. *Station* : Bozen-Gries.

The *buildings*, three in number, are of four or five stories, ranged side by side, well provided with balconies and suitably decorated and furnished.

Only slight cases are admitted. The sanatorium is open from 1 September till end of June.

Medical Director : Dr. V. M. Malfer.

ST. PANCRATIUS IN ARCO

belongs to the Congregation of the Sisters of the Cross in Ingenbohl, Lucerne, Switzerland, who raised the funds for its erection, and continue to manage it with medical help.

Situation : It has the Sarcatel mountain to the north, and in front of it a plain four kilometres long surrounded on three sides by high mountains and ending on the Lago di Garda. Monte Brione shelters the sanatorium from the strong lake wind, while on other sides the only gap in the mountains is where the Sarca bursts through. Scattered houses are placed to the north of the building, but the mountains can be reached without passing through the town. *Altitude* : 90 metres.

The *building* has a straight front with three projecting pavilions to the north of the corridor, the bedrooms forming a single row to the south. The basement contains the kitchen de-

partment, store-rooms, douche-rooms, sisters' rooms, heating apparatus, and a few common rooms for patients. On the ground floor is the office and lift and chief staircase, the dining-saloon in the west wing, the drawing-room and second medical officer's room in the east wing. Closets and lavatories are placed in all three northern pavilions. On the first and second floors, the patients' rooms occupy three sides, the north side being utilized for consulting rooms and laboratory below, and chapel above. Three bedrooms on the third floor are used for sisters who come for a holiday. The whole building is supplied with electric *light* and bells, telephone from the doctor's room, hot and cold water in the corridors and hot-water radiators. The walls are covered with washable paper, the floors with "Eubæolith" of a light brown colour; in the bedrooms are metal pedestals, lounge chairs covered with removable covers, washable bed-hangings and awnings, and double doors. A number of common rooms have been provided, such as billiard-room, music-room, etc.; but the drawing-room may only be used from 8 to 9.30 p.m. Nobody can enter or leave the building without the knowledge of the portress. The main entrance has next to it a cloak-room with boot-room; the door opens by touching a knob, and is self-closing. The staircase is forbidden to patients going upstairs, who must use the lift. A subterranean passage leads from the kitchen to a distant spot whereon has been erected a coal depot, laundry and disinfector, so that no objectionable smells can reach the patients' quarters.¹

Medical Director: Dr. Paul Fischer.

¹ "Tuberculosis," Feb., 1904.

CHAPTER XXX.

GREECE AND THE BALKAN STATES.

Bulgaria.

A NATIONAL Association for Prevention of Tuberculosis, uniting thirty-four provincial societies, was founded at Sofia in 1909. The first provincial society was started at Troyan in 1908.

The first Bulgarian sanatorium was opened in 1905 at Trojan in the Balkan Mountains, with sixty beds. Another may be opened this year with 125 beds (both sexes) at Svoge, between Sofia and Plevna. There is also a seaside sanatorium at Varna with fifty beds for children, due to the initiative of Queen Eleonora. Another sanatorium has been opened at Bourgas; and one is to be opened at Iscretz in the Isker valley, 35 kilometres north of Sofia, with 150 beds, to commemorate the twenty years' anniversary of the accession of King Ferdinand I. A donation of 300,000 frs. was given by him towards the expenses of erection. There is a public garden at Troyan open to consumptives; and two dispensaries have been opened at Sofia.

Roumania.

A Society for the Prevention of Tuberculosis in Roumania was founded in 1901. The first dispensary was started in the Coltza Hospital at Bucharest; and in 1904 a Government grant of 400,000 frs. made it possible to build the first sanatorium. There are now four tuberculosis dispensaries at Bucharest. There is also a children's sanatorium at Constantza on the coast, with 100 beds, due largely to the exertions of Mme. G. Balsch. Three other institutions for tuberculous patients were opened last year, two sanatoria (each with fifty beds) at Biscericani and at Barnova, and an annexe with twenty beds at the Nifon Hospital. The Queen of Roumania contributed

119,000 frs. in 1906 towards the cost of one of these sanatoria (St. Elizabeth Sanatorium).¹ A small isolation hospital has also been opened at Galatz with twenty-four beds, associated with a dispensary, so that altogether there are 330 beds for tuberculous patients in Roumania.

THE FILARET SANATORIUM.

On a hill near Bucharest, on 7 hectares of ground belonging to the city, 80 metres above the sea level, three establishments were opened in 1906: a dispensary, a hospital with sixty-six beds, and a sanatorium with twenty beds. The hospital has wards with two to four beds apiece, linoleum-covered floors, oil-painted walls, fanlights to the windows, and open-air rest galleries for day use. The men are on the ground floor, the women above. The sanatorium accommodates ten of each sex. At first it was not filled, owing to the fear of infection; but now there is a waiting list.²

Servia.

A National Anti-tuberculosis Association was founded ten years ago, which receives a large annual subscription from King Peter and large subventions from the Government and the city of Belgrade, part of which is devoted to the support of model schools. The chief activity in Servia has been directed towards the establishment of these schools and convalescent homes for children. The first was opened in 1904, five miles from Belgrade, on property given by King Peter, accessible by electric tram and capable of receiving 200 children. Others have been opened in Sabac and Kragujavac.

A sanatorium has been built for the more advanced cases at Belgrade by the corporation.³

Turkey.

An International Tuberculosis Society has been recently formed at Constantinople.⁴

¹ "Lancet," 16 Feb., 1907, p. 471.

² "Trans. Int. Tuberc. Conference," Rome, 1912.

³ "Tuberculosis," Sept., 1912.

⁴ "Lancet," 4 Jan., 1913.

Greece.

A Panhellenic Anti-tuberculosis League was founded in 1901.

There is a hospital with forty beds for tuberculous patients at the foot of Hymettus near Athens, founded by the "Sotiria" philanthropic ladies' society in 1905 ; and a sanatorium on Mount Athos ; also two dispensaries in Athens and the Piræus respectively.¹

¹ B. Patrikios, "Zeitschr. f. Tuberk." III., 28; "Trans. Int. Tub. Congress," Washington, 1908.

SECTION IV.—BELGIUM, HOLLAND, AND LUXEMBURG.

CHAPTER XXXI.

BELGIUM.

MUCH has been done in both Belgium and Holland to co-ordinate the preventive forces against tuberculosis. In Luxemburg the Anti-tuberculosis League has received legal recognition, and a dispensary has been opened in the city.

In the absence of compulsory notification or insurance against sickness, all the anti-tuberculous work in Belgium has depended upon voluntary efforts. A National Anti-tuberculosis League was founded in 1898. The chief activity has been directed towards the establishment of dispensaries, of which there are now twenty-four in existence. There are eight sanatoria, two of which are for private patients.

Name and Locality.	Opened.	Terms in frs. per Week.	Medical Officers.	Patients Ad- mitted.	Beds.
Mont sur Meuse	1901	—	Dr. Hottlet	m., w.	60
Bockryck - Genck - lez - Has- salt	—	9-11	Dr. Lories	m., w.	60
Borgoumont (for Liège)	1903	1 to 7½	Dr. van Beneden	m.	114
La Hulpe, Waterloo (for Brabant)	—	—	—	m.	50
Brecht Saint Antoine (for Antwerp)	—	—	—	m.	—
Military San., Beverloo	—	—	—	m.	—
Alsemberg (for Brabant)	—	—	—	m., w.	80
Magnée, Fleuron (for Liège)	1912	—	—	w.	26
Namur Civil Hosp.	—	—	—	—	—
St. Trond „	—	—	—	—	—
Ath „	—	—	—	—	—
Louvain Hosp. Con., St. Josse-ten-Noode	—	—	—	—	—
Ixelles Civil Hosp.	—	—	—	—	—
Antwerp Hosp., Stuyven- berg	—	—	—	—	—
Antwerp Hosp., Ste. Elisa- beth	—	—	—	—	—
Juinet Hosp. San. (Hai- nault)	—	—	—	—	—

THE MONT SUR MEUSE SANATORIUM.

Situation: On a limestone plateau overlooking the valley of the Meuse, protected by well-wooded mountains to the north, east, and west. The *grounds* include a well-wooded park and a garden. *Altitude*, 660 feet.

The *buildings* are of granite with brick framework round the windows, which are casements, surmounted by fanlights. The main mass forms an imposing structure of five stories, with a central dome and two smaller towers, a central and two lateral projections. The basement contains the offices, bath- and douche-rooms, heating apparatus, and kitchen quarters. Above this are a large dining-room, some other day rooms, directors' room, laboratory, and a few patients' rooms. Above these are servants' rooms, the patients' rooms being mainly on the three upper floors. The ends of the corridors have been blocked by W.C.'s. There is a chapel on the first floor. There is an easy staircase, and an electric lift, which goes up to the flat roof, where there is a refreshment room. *Heating* is by low-pressure steam, *lighting* by electricity; internal decorations of the usual type. There is a separate doctor's villa, as well as some other accessory buildings.¹

THE BOCKRYCK SANATORIUM,

at Bockryck-Genck-lez-Hassalt, in the province of Limburg, is *situated* on a plateau, far from populous centres, in the midst of beautiful country. *Grounds*: Fifty-two hectares, including gardens, a farm with tuberculin-tested cows, and several ponds, one of which can be used for swimming. *Soil*: Permeable. *Climate*: Stated to be dry and bracing.

Buildings: A group of ordinary substantial houses transformed by the addition of balconies, verandahs and awnings. A large verandah forms a winter-garden containing a billiard-table, etc. Most of the patients' rooms face south. Large dining-room, chapel, music- and reading-room, ladies' room, dark room, bath- and douche-rooms, laboratories. *Heating* by low-pressure steam. *Lighting* by electricity.

¹ "Le Mouvement Hygiénique," Bruges, September, 1901.

THE BORGOUMONT SANATORIUM.

Situation : Near Spa by the River Borgoumont, protected to the east, north, and west by woodland (partly conifers) and by the mountain La Fagne (2130 feet). *Altitude* : 1360 feet. *Grounds* : 138 acres.

Buildings : A central one facing south, forming a curve, containing the wards ; an administrative block with doctor's house, to the east ; a kitchen block ; and accessory structures. The central building, of three stories, has in the basement and ground floor some common rooms and open-air galleries ; on the higher floors there are wards, mostly with four beds each, some containing six, three, or one each ; and above these the servants' quarters. The dining-room occupies a wing connecting the main building with the kitchen block, and has under it the heating apparatus. There are linen rooms in the attics of the main building. Dirty linen goes down a shoot to the basement, and thence to the disinfector, laundry and mending-room.

The administration block also includes the bath- and douche-rooms, and above these the laboratories, office, and consulting-rooms. The doctor's house projects so as to command the fresh-air galleries. In this block there are also isolation rooms and nurses' quarters. *Heating* is by low-pressure steam ; *lighting* by electricity. Internal details in the usual style ; floors of *béton armé* covered with linolith, forming a surface free from cracks. Ventilation shafts extend to the roof ; there are also electric fans. There are sash windows. The doors have a ventilator with parallel panes of glass.

Cost : 1,200,000 frs., including the land and the private road. There is an endowment.

Charges : 1 to 3½ frs. per day ; for single-bedded rooms, 7½ frs.¹

THE PUBLIC SANATORIUM FOR BRUSSELS

is *situated* in 10 hectares of ground at La Hulpe, near Waterloo.

Buildings : The main building has all patients' rooms on the south side, and consists of a raised basement, ground floor and three upper stories. The basement contains the dining-hall, projecting

¹ "Zeitsch. f. Tuberk.," April, 1902, September, 1903 ; "Tuberculosis," October, 1903.

forwards; also the kitchen, cloak-rooms and douche-rooms. On the ground floor are four patients' rooms, a vestibule, laboratory and surgery, doctor's room overlooking the open-air gallery, the chapel, consulting-rooms and quarters of the secretary and medical director. The first and second floors have each eighteen beds for patients. On the north side are the lavatories, W.C.'s, linen-room and nurses' rooms. On the third floor, two dormitories for patients, an infirmary, linen-room and staff rooms. *Cubic space*: Thirty cubic metres per head. *Heating* by low-pressure steam, *lighting* by electricity. Two fresh-air galleries are arranged on each side of the main building, a third in front of the ground floor. Drainage into septic tanks. The laundry and engine-house are in a separate building to the north.

THE ALSEMBERG SANATORIUM

was built with the help of a legacy of 5,000,000 frs. left by Georges Bruggmann to the City of Brussels. It is *situated* in 20 hectares of ground, well sheltered by pinewoods.

The *building* is heated by low-pressure steam, *lit* by electricity. The kitchen and administration department are in a separate building to the north.

THE MAGNÉE SANATORIUM

was built with the help of a legacy from Montefiore Levy to the Province of Liège. It is linked up with the four dispensaries of Liège, and was the first women's sanatorium to be erected in Belgium.

CHAPTER XXXII.

HOLLAND.

THERE is a complete organization in this country against tuberculosis. There are 140 local associations, of two kinds, one dealing solely with tuberculosis, the other (Green Cross) dealing with sickness generally. These societies are subsidized by the Government, which pays two-thirds of the salary of the lady health visitors, two-thirds of the cost of disinfection, of sputum-cups and the like, and of the extra cost of more suitable quarters; in the next place it bears half the cost of offices and half the cost of sputum analysis; thirdly, 0·25 cent per head per day towards cost of sanatorium treatment; and finally, for general purposes according to the population of the district served. This Government subsidy amounts to 125,000 gulden per annum.

There are also eight provincial associations; and these, the sanatoria, and the local associations, are all represented on the General Council of the National Association.¹ There are arrangements for training nurses and others to act as tuberculosis visitors for the dispensaries,² of which there are thirty in existence.

A number of convalescent homes are situated along the coast of Holland, which receive delicate or tuberculous children for part or the whole of the year. The charges vary from one to three gulden per day; some however are free. There are eight Finsen Institutes in Holland, three being in Amsterdam.

¹ Pynappel, "Trans. Int. Tub. Conf.," Rome, 1912.

² Pynappel, "Int. Tub. Conf.," Brussels, 1910.

Name and Locality.	Opened.	Terms in frs. per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
POPULAR SANATORIA—					
Sophia Stichting, Scheveningen	1880	0·75-1·0	Dr. G. M. Mol	S., c.	75
Oranje-Nassaus Oord, Renkum	1901	2·20	Dr. A. Schuld	E.	103
Hellendoorn	1902	2·0	Dr. B. H. Vos	E., M.	156
Hooglaren	1903	2·0	Dr. Y. Terpstra	E.	77
Someranck, Harderwyk	1906	2-2·50	Dr. H. Blanken	E.	110
Children's San., Katwyk-a-Z.	1908	1-1·50	Mme. Dr. van Doop	c.	106
Heremastate, Joure	1910	1·25	Dr. J. Geers	E.	64
Children's San., Hoog Blaricum	1912	1·25	Dr. F. C. Deterding	c.	62
Nat. San., Dekkerswald, Groesbeek	1913	—	Dr. Jongmans	—	—
Dutch San., Davos	1897	—	See Switzerland	—	—
PRIVATE SANATORIA—					
Beekbergen	—	3-3·50	Dr. A. H. Nolst Trinité	—	34
St. Bernardus Gesticht, Bredevoort	—	2-2·50	Dr. H. J. der Wedussen	—	—
Dennenoord Doorn	1901	6-7·50	Dr. H. J. de Wey	—	14
Wondhuis Doorn	—	4·5	Dr. H. J. de Wey	c.	—
Middenbosch Doorn	—	2·50-3	Dr. J. H. van Epen	—	—
Heim Dennen, Duizel	—	—	Dr. B. v. de Brink	—	—
Erica, Nunspeet	1904	6-8	Dr. H. Schut	—	14
Lautenbach „	—	2-3	—	—	—
Dennenhof Putten	1904	2-2·50	Dr. M. C. 'G. Middelberg	—	37
Renkum	1906	3-4	Dr. K. T. Haverkorn van Rysewyk	—	—
Boschrust, Renkum	—	3-4	Dr. W. Kersten	—	—
St. Oda Gesticht, St. Oedenrode	—	1·25-2·25	Dr. G. Andereg	—	—

ORANJE-NASSAUS OORD

was erected with money collected as a gift to the Queen Regent on the accession of her daughter Queen Wilhelmina. It is *situated* in one of the royal parks, at Renkum in Gelderland, near the Rhine. An artificial hill has been raised at the least protected part and planted with trees.

Buildings : These are of various sizes, mostly of two stories, and form a large semi-circle with the old palace. This accommodates thirty patients, the rest being in new blocks. The wards contain from one to six beds apiece. Where several occupy one room, the cupboards have wings with screens attached, to increase the privacy. There are verandahs front and back, paved with terrazzo. The

corridors are warmed. Floors are mostly of *torgament*, elsewhere covered with linoleum. In addition to the dining-room, there are a conversation-room, reading-room and winter gardens; surgery, laboratory, director's room, and a complete hydropathic installation in which the douche can be regulated either by the patient or by the doctor in an adjoining room. Electric *lighting*. Central steam-*heating*, the pipes being brought from the engine-house through a tunnel. The kitchen is at a distance, the food being brought by an electric tram. Near the kitchen are the laundry and power-house. Opposite the old palace is the medical director's villa, and near it one for the matron and assistant physician.¹

Total cost : Over 410,000 gulden.²

Average stay : Four to five months.

HELLENDOORN SANATORIUM,

in the Province of Overijssel, in a district stated to be fairly free from fogs, is sheltered to the north and east by a hill 50 metres high, and surrounded by pine woods.

The *buildings* consist of a picturesque main block of one story at the sides, two in the centre, forming a curve with day rooms and verandahs to the sides.

Eighty feet farther north is a separate administrative block with servants' quarters and kitchen. There is a separate kitchen for Jews. The wards are all to the south. On each side are three for four patients apiece, and two with six beds each. Floors are of *torgament* with rounded angles. To the north of the corridor (which ends in a day room) are the lavatories, W.C.'s, and an isolation room. In the centre on the ground floor are rooms for the doctor, management, laboratory and surgery, dining-room for nurses, and bath-rooms; on the first floor the quarters of the assistant medical officer, nurses' rooms and those for patients requiring special nursing. The men are on one side of the sanatorium, the women on the other, with separate lavatory, bath-rooms, douche-room, consulting-room, fresh-air gallery, entrance and cloak-room. *Heating* is by warm water or low-pressure steam at will. *Lighting* by electricity.

¹ "Zeitsch. f. Tuberk.," April, 1902; "Lancet," 27 July, 1901.

² W. J. van Gorkum, "Zeitsch. f. Tuberk.," x. 5, 1907, p. 431.

There are also a laundry, disinfector, engine-house, villas for the medical director, the secretary and engineer, stables, and isolation pavilion.

Cost of erection : 260,000 gulden, including 25,000 for furniture.¹

THE AMSTERDAM SANATORIUM,

at Hooglaren, about eighteen miles from the city, has floors of *torgament*, low-pressure steam *heating* and electric *lighting*. In addition to a large sun parlour, it has five rest-shelters in the grounds.

Cost : 3400 gulden per bed.

Average stay : Three to five months.²

¹ "Zeitsch. f. Tuberk.," Nov. 1901, Oct. 1902, May 1903; "Lancet," 27 July, 1901.

² W. J. van Gorkum, *loc. cit.*

SECTION V.—THE BRITISH ISLES.

CHAPTER XXXIII.

THE passing of the Insurance Act of 1911 has caused great changes in the antituberculous organization of this country. Temporary arrangements have been made in most parts of the kingdom for the reception of cases requiring institutional treatment, although these arrangements are still far from adequate. County schemes are being prepared or started, which will eventually lead to a complete organization of the available forces for suppressing tuberculosis.

There is little doubt that whereas a minority of cases have in the past been efficiently treated, in the large majority treatment has been haphazard and discontinuous, not seriously undertaken until the most favourable period had gone by, and not supplemented after apparent convalescence, as it should be, by hygienic measures and medical supervision. There is so much being done to remedy this state of affairs that any account of existing institutions and arrangements must needs be imperfect.

The general scheme may be described as follows: dispensaries will be established in every place requiring them, for the discovery of early cases and the treatment of ambulant patients, including hygienic advice in the homes. Whenever institutional treatment or antituberculous training is necessary, patients will be sent to a sanatorium, either direct or through a reception hospital. For advanced and chronic cases, and for early febrile or complicated cases, hospital sanatoria will be necessary, either suburban or connected with the country sanatoria. Many of the Poor Law Infirmaries are admirably adapted for the treatment of such cases; but the Insurance Act forbids their employment for the insured classes. It will therefore be necessary to make large provision elsewhere of beds for

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such purposes. As a temporary measure, disused smallpox hospitals and special pavilions of isolation fever hospitals are being employed ; but eventually it will be found advisable to set aside certain places exclusively for the clinical treatment of tuberculosis.

As an indirect consequence of the public measures which are being taken, some of the smaller private sanatoria are now receiving insured patients on reduced terms, and increasing their accommodation accordingly. Almost everywhere the treatment by graduated labour is being adopted, instead of treatment by walking and hill climbing alone. Tuberculin is being much more freely employed, especially in the dispensaries and by private practitioners. Experience will show how far it will do away with the need for sanatorium treatment in the afebrile. Rest treatment and hygienic training are not easily applied in the working-class home without resort for a time to the sanatorium ; and graduated labour is impossible out of such an institution. When a tuberculous patient works for his living, the amount of work done is determined by pecuniary, not medical considerations.

CHAPTER XXXIV.

THE NORTHERN COUNTIES.

INCLUDING Northumberland, Cumberland, Durham, Westmorland, Yorkshire, Lancashire, and Cheshire.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
NORTHUMBERLAND—					
† Newcastle San., Barrasford	1907	42/-50/	Dr. W. C. Rivers	All, m. All, w.	30 20
Philipson San., Stan- nington	1907	20/	—	c.	86
Royal Victoria Inf., Newcastle-on-Tyne	1906	free	—	s.	(430)
DURHAM—					
† Durham County San., Stanhope	1910	sub. free ins. 25/ P. L. 30/ others 42/	(Dr. John Gray)	m.	45
† Durham County San., Wolsingham	1909	sub. free ins. 25/ P. L. 30/ others 42/	Dr. E. G. D. Menzies	w., c.	30
† Felix House, Middleton St. George	1903	2 to 4 gs.	Dr. C. S. Steavenson	m., w.	30 8
Philipson San., Stan- nington	—	—	See Northumberland	—	—
Maiden Law Hosp., Lan- chester	1907	12/6	Dr. W. M. Morrison	P. L.	30
Black Fell Hosp., Chester- le-Street	—	—	Chester-le-Street, R. D. C.	—	18
Hebburn U. D. C. Hosp.	—	—	Hebburn U. D. C.	—	16
Sealburns Hosp. (Blay- don, Ryton)	—	—	Blaydon and Ryton Jt. H. B.	—	14
Sunderland Isol. Hosp.	—	—	Spec. pav. being con.	—	12
Tindale Crescent Hosp., Helmington Row Hosp.	—	—	Auckland Jt. Hosp. Board spec. pav.	—	26
Darlington S. P. Hosp.	—	—	Darlington U. D. C.	—	14
Stockton S. P. Hosp.	—	—	Stockton U. D. C.	—	14
Thornley Hosp.	—	—	Easington and Sedge- field Jt. Hosp. Bd.	—	20
Barnard Castle R. D. C. Hosp.	—	—	Barnard Castle R. D. C.	—	4

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
CUMBERLAND—					
† Blencathra San., Threl- keld	1904	30/-42/	Dr. W. Goodchild	E.	36 ¹
Cumberland Inf., Carlisle	—	—	—	s.	—
Whitehaven Inf.	—	—	—	s.	—
Workington Inf.	—	—	—	s.	—
WESTMORLAND—					
† Westmorland San., Meathop	—	—	See Lancashire	—	—
County Hosp., Kendal	—	—	—	s.	51
YORKSHIRE, N. RIDING—					
† Wensleydale San., Ays- garth	1907	42/	Dr. E. M. Hime	E., m. E., w.	37 13
† Ruebury House San., Osmotherley	—	3 and 5 gs.	Dr. H. B. Luard	E.	4
Middlesboro' Corp. Hosp., Hemlington	—	—	(R. M. Officer)	—	20
YORKSHIRE, E. RIDING—					
† Hull and E. Riding Conv. Home San., Withernsea	1902	25/ 30/	Dr. A. E. Sproule	M.	33
† Kingston - on - Hull Inf. Dis. Hosp.	—	—	—	F. H.	30
YORKSHIRE, W. RIDING—					
W. Riding San., Ben Rhydding	proj.	—	—	E.	150
† Balby Hospital, Doncaster	—	—	—	F. H.	24
† Eldwick San., Bingley	1906	30/	Dr. Margt. Sharpe and Dr. Isabella M. Little	w., c., E.	28
† Badsley Moor San., Rotherham	1911	—	(Dr. R. G. Riddell)	P. L.	24
† Morton Banks San., Keighley	1910	27/6	Keighley and Bingley Jt. Hosp. Bd.	F. H.	30
† Mill Hill Hosp. Bradford Union San., Eastby	— 1903	— 30/, F.	for Huddersfield Dr. M. C. Macdonald	F. H. P. L., m.	10 33
† Bierley Hall Hosp., Brad- ford	1912	F.	(Dr. Harold Vallow)	E.	50
† Halifax Boro Hosp., Stoney Royd	—	—	—	—	12
† Leeds San., Gateforth	1901	F.	—	E.	56
† Armley House, Leeds	1904	F.	Dr. G. S. Byrne	A.	44
Dean Head San., Hors- forth	1908	30/	(Dr. H. Bailey)	m.	26
† Killingbeck Hosp.	—	—	for Leeds	F. H.	—
† Brierley Com. San.	—	—	for Hemsworth	—	—
† Winter St. Hosp., Shef- field	1912	F.	—	A.	120
† Crimicar Lane Hosp., Sheffield	—	F.	Dr. E. H. Williams	m.	22
† Commonsides Hosp., „	1908	F.	„	w.	20
Sheffield Union San., „	1901	F.	Dr. J. Clark	P. L., m. P. L., w. P. L., ch.	70 21 22
Ecclesall Union Hosp.	—	—	Dr. A. K. Gale	P. L.	70

¹ To be enlarged to 61 beds.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
LANCASHIRE—					
Westmorland San., Meathop	1900	25/ 42/	Dr. C. F. Walker, Dr. W. E. Fitzgerald	E.	135
+ Aitken San., Holcombe Brook	1910	F. or 30/	Bury Jt. Hosp. Board, Dr. J. B. Morton	E.	60
+ Florence Nightingale Hosp.	1903	30/	"	A.	(88) 18
+ Ainsworth Smallpox Hosp.	—	30/	"	F. H.	35
+ Wilkinson San., White- hill	1913	F.	Bolton Conv. Home (Dr. J. D. Marshall)	E.	35
Wigan and Dist. Sm.-pox Hosp., Orrell	—	—	Wigan and D. Jt. H. Bd.	F. H.	50
Elswick Sm.-pox Hosp.	—	—	Fylde Preston and Garstang Jt. Hosp. Com.	F. H.	50
+ Bolton Corp. Isol. Hosp.	—	—	—	F. H.	24
+ Linacre Hosp., Bootle	—	—	—	Gen. H.	8
+ Sankey San., Warrington	—	—	—	F. H.	18
Warrington Boro' Hosp.	—	—	—	Gen. H.	(80)
+ Blackpool Hosp.	—	—	—	F. H.	—
Liverpool—					
+ Hosp. Cons. Dis. Chest, Mt. Pleasant	1864	—	—	All	30
+ Park Hill Inf. Dis. Hosp., Dingle	—	—	—	F. H.	50
+ Fazakerley Hosp., Liver- pool	1905	—	—	F.H.,m. F.H.,w.	50 30
Liverpool San., Kings- wood	—	—	See Cheshire	—	—
West Derby San., Heswall	—	—	"	—	—
Manchester—					
Millfield Home for Pulm. Cons.	—	—	—	—	120
+ Monsall Hosp., Newton Heath	—	—	for Manchester	F. H.	—
Clayton Vale S. P. H.	—	—	"	F. H.	32
Crossley Home	—	—	"	A.	25
Hosp. Cons. Dis. Chest, Bowdon	—	—	See Cheshire	—	—
Baguley Sanatorium	—	—	"	—	—
Crossley San., Kingswood	—	—	"	—	—
Salford—					
Drinkwater Park San.	1913	F.	Dr. C. C. Fitzgerald	m., w.	30 30
Crossley San., Kingswood	—	—	See Cheshire	—	—
Oldham—					
Strinesdaile Munic. San.	—	F. 30/ 42/	Dr. J. B. Wilkinson	F.H.,m. F.H.,w.	9 9
St. Helens—					
+ Eccleston Hall, Shatto Heath	1913	F. 30/	St. Helens Corp.	F.H.,m. F.H.,w. F. H., c.	19 19 13
+ Borough San., Peasley Cross	—	—	"	F. H.	8
Bourne Castle, Bel- broughton	—	—	See Worcestershire	—	—

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	No. of Beds.
CHESHIRE—					
† Manchester Cons. Hosp., Bowdon	1875	—	—	—	50
† Crossley San., Kingswood	1905	F. 30/ 42/ 63/	Dr. G. Heathcote	E., m.	55
Liverpool San., „	1901	12/6 20/	Dr. H. Hyslop Thom- son	E., w. E.	45 40
West Derby San., Hes- wall	1902	F.	(Dr. J. B. Yeoman)	P. L., m.	24
† Wallasey Boro' Hosp., Liscard	—	—	—	—	16
Birkenhead Boro' Hosp.	—	—	—	—	—
Baguley San., Timperley	—	—	(Manchester Corp.)	A.	150 ¹
West Kirby Conval. Home	—	—	—	S., c.	—
County Chns. Hosp., Hes- wall	—	—	—	S., c.	—
† Boro' Smallpox Hosp., Macclesfield	—	—	—	E.	12
Isol. Hosp., Crewe	—	—	—	—	2
† Sealand Hosp.	—	—	for Chester	F. H.	—

Signs and Contractions: † = approved for insured cases by the L. G. B.; U. D. C. = Urban District Council; R. D. C. = Rural District Council; J. H. B. = Joint Hospital Board; H. = hospital; F. H. = fever hospital or smallpox hospital; F. = free; E. = early cases; M. = moderately advanced cases; A. = advanced cases; m. = men; w. = women; c. = children. Institutions in square brackets are temporarily employed. Number of beds in brackets = not exclusively for tuberculosis.

Northumberland.

There is a sanatorium for adults at Barrasford, and one for patients under sixteen years of age at Stannington. Cases of surgical tuberculosis are admitted into the Royal Victoria Infirmary, Newcastle-on-Tyne, which was originally founded in 1751. The Northern Counties Hospital for Consumption and Diseases of the Chest has only an Out-patient Department. There is a Tuberculosis Dispensary at Newburn—the first to be opened in England.

THE NEWCASTLE-UPON-TYNE AND NORTHUMBERLAND SANATORIUM,

Barrasford, was opened by the local branch of the National Association for Prevention of Consumption, in the open country eight miles from Hexham, on a site sloping south and west, protected by hills to the north-east and by trees to the north and west. *Station*, Barrasford, N.B.R., three miles. *Soil*: Carboniferous limestone. *Altitude*: 630 feet. *Grounds*: 60 acres, of which ten are woodland.

¹ To be increased to 300.

Buildings : Consist of a main block, an isolation block, laundry block, stables and caretaker's house. The main building has a three-story centre with long two-story wings, diverging at an open angle. There are open-air galleries in the centre, patients' rooms on either side ; all facing south, with a corridor behind and sanitary pavilions to the north. Rooms are all single bedded, with casement windows opening on to separate balconies, and fanlights over the doors.

Cubic space : 1600 cubic feet. Running north from the centre is the administration, and beyond it at right angles the dining-hall and recreation-hall. The nurses' quarters are in the upper floor of the centre of the building, the servants' bedrooms in the administration block.

The buildings are of wood covered externally with corrugated iron, internally with uralite. The chimneys, foundations, and engine-house are of stone. The latter building is combined with laundry and disinfecter. *Heating* by low-pressure steam pipes. *Lighting* by electricity.

Apply to the Secretary, Star Buildings, 26 Northumberland Street, Newcastle-upon-Tyne.

Financial : Cost of site, buildings, etc., £22,700 ; fifty more beds can probably be added for £5000.

REFERENCE.—"British Journal of Tuberculosis," Oct., 1907 (plan).

H. T. Bulstrode, "On Sanatoria for Consumption". Supplementary Report to the L. G. B. for 1905-6. London, 1908, p. 447.

THE PHILIPSON CHILDREN'S SANATORIUM,

Stannington, is situated in 170 acres of ground, including farm land, a little south of Morpeth. *Soil* : millstone grit. *Buildings* of brick and stone, mostly of two stories. *Lighting* by acetylene gas.

Apply to the Poor Children's Holiday Association, 66 Percy Street, Newcastle-upon-Tyne.

REFERENCE.—"British Journal of Tuberculosis," July, 1908.

Durham.

In addition to two sanatoria, for men and women respectively, and a private sanatorium for both sexes, with a total of thirty beds available for county cases, there are a number of hospitals which receive tuberculous cases, and negotiations are in progress with a number of others. Sixteen beds for children have been reserved for the county in the Stannington Sanatorium, Northumberland.

There are six tuberculosis dispensaries in Stockton, Darlington, Stanley, Sunderland, and Hartlepool. Eleven others are projected.

Separate tuberculosis arrangements will probably be made for county boroughs of Gateshead, South Shields, Sunderland and West Hartlepool.

THE DURHAM COUNTY SANATORIUM FOR MEN,

Horn Hall, Stanhope, Co. Durham, is situated in the upper part of Weardale, some distance west of the coalfields, in a district well wooded with pines and other trees. Surrounded by moorland, it is sheltered to the north by a spur of the Pennine Chain, which rises in places to 600 feet above the institution.

Soil : Limestone. *Altitude* : 700 feet.

Grounds : $2\frac{1}{2}$ acres of orchard, protected by high walls, on the north bank of the Wear.

Buildings : A transformed stone mansion, with later additions. The bedrooms are mostly on the south side; floors covered with cork carpet, walls painted with duresco. French windows; louvred doors. Beds one to four per room, mostly two or three. Six baths, eight W.C.'s. One verandah, many shelters in the grounds for day use. *Heating* in the old part by open fires (seldom used); in the new, partly hot-water pipes, partly none. *Lighting* by gas.

Financial : Held on an eighty years' lease at £35. Cost of additions and alterations was £3875. Capital was raised by subscriptions, largely from working men. Cost of maintenance : £1 os. $1\frac{1}{2}$ d. per week. Workmen subscribing one shilling per annum have first claim on the beds. Non-subscribers pay 42s. Preference given to those from Durham County.

Admissions : Apply to the Secretary, 54 John Street, Sunderland.

Statistics : Patients admitted year ending 30 April, 1912 : 150.

Average length of stay : 16·1 weeks.

REFERENCE.—Bulstrode, *loc. cit.*, p. 373.

THE DURHAM COUNTY SANATORIUM FOR WOMEN AND CHILDREN,

Wolsingham, is situated in the valley of the Wear, in 5 acres of garden, surrounded by moorland. *Soil* : Gravel over limestone. *Altitude* : 600 feet.

Buildings: A stone-built private residence converted for its present purpose, French windows being supplied and bedroom doors louvred. There is one single-bedded room. Maximum number of beds in a ward is four. *Heating* by open fires. *Lighting* by gas.

Financial: Cost of building, land and alterations, £4903. Cost of maintenance: 16s. 5½d. per week. Supported by subscriptions as at Stanhope. Terms the same.

Patients admitted year ending 30 April, 1912: 104. *Average stay*: 15·7 weeks. *For admissions*, see p. 189.

REFERENCE.—“Brit. Med. Journal,” 17 Nov., 1908.

THE MAIDEN LAW SANATORIUM,

Lanchester, Co. Durham, belongs to the Lanchester Joint Hospital Board.

Situation between Newcastle and Durham. *Soil*: Red clay above coal measures. *Altitude*: 780 feet. *Grounds*: 2 acres.

Buildings: Patients are received into wards and shelters. There are three single-bedded rooms. Largest number of beds in a ward: Eight. There is no heating for wards or shelters. *Lighting* is by gas. There is cross-ventilation by large windows.

Staff: A visiting medical officer, matron and two nurses.

Financial: Cost of land was £400; of buildings £3500. The place is supported by the rates; but arrangements may be made to receive insured patients.

Patients admitted in 1911-12: 50. *Average stay*: four months.

FELIX HOUSE,

Middleton St. George, is situated four miles from Darlington, overlooking the Tees Valley and the Cleveland Hills. *Station*: Dinsdale (N.E.R.). *Grounds*: 8 acres, partly woodland. *Altitude*: 200 feet. *Soil*: Magnesian limestone.

Buildings: Consist of an ordinary brick-built house, used chiefly for administration, and additions in the shape of bungalows and chalets. There are three single-bedded rooms; maximum number of beds in a room, four. The chalets are suitably constructed, with

large windows, partly furnished with louver shelters. No heating. Electric lighting.

Staff: The medical director and eight nurses and servants.

Cumberland.

There is one sanatorium in Cumberland, at Threlkeld, and one dispensary at Millon. Surgical cases are treated at the Cumberland Infirmary, Carlisle, the Whitehaven Infirmary, and the Workington Infirmary. There are no special arrangements for children.

THE CUMBERLAND SANATORIUM,

Blencathra, Threlkeld, Penrith.

Opened 4 October, 1904, by the Cumberland branch of the National Association for Prevention of Consumption.

Situation: A few miles from Keswick, on the southern slopes of Saddleback, commanding an imposing view of Helvellyn, Scawfell and Lake Derwentwater. *Station*: Threlkeld, L. & N.W.R., two miles. *Soil*: Ordovician rock (slate). *Altitude*: 900 feet. *Grounds*: 40 acres, of which a large part has been let.

Buildings: A pre-existing house has been used as quarters for the resident medical officer, and another as a laundry. The administrative block, in the centre, is of stone; the wings with patients' quarters being of wire-wove material and match boarding. Each wing has ten cubicles, with windows reaching to the ceiling, each one consisting of four casements. There is an open space above the door into the corridor. *Cubic space* per bed = 1300 cubic feet. Attached to each wing is a sanitary annexe with baths and lavatories. There are also sleeping huts, in which *cubic space* is 500 to 750 cubic feet. *Heating* by hot-water pipes. *Lighting* by acetylene gas.

Financial: Cost of erection and installation, including land and twenty beds = £6000. Sleeping huts cost £20 each, and there is kitchen accommodation for many more. Cost per bed with twenty beds would be £240; with forty, £165. The capital was raised by subscriptions.

Maintenance is by contributions from the Carlisle Board of Guardians, the Urban District Councils of Egremont and Penrith,

and by fees from patients. Twenty-five beds are to be added for patients sent by the County Insurance Committee.

REFERENCE.—Bulstrode, *loc. cit.*, p. 358.

Westmorland.

Cases of pulmonary tuberculosis from this county are sent mainly to the Westmorland Consumption Sanatorium at Meathop, Grange-over-Sands (see Lancashire), where there is also a Home for advanced cases, and a children's department with open-air school attached. Dispensaries are being provided at Meathop, Kendal, and Appleby. Cases of surgical tuberculosis are received into the County Hospital, Kendal, a general hospital with fifty-one beds. During 1912 there were twenty-seven such cases treated there. A separate open-air recovery school for Westmorland school-children will probably be opened at Meathop, with thirty beds. The medical superintendent of the Meathop Sanatorium acts as Tuberculosis Officer for the county.

Westmorland was probably the only county in England with a fairly complete organization for dealing with pulmonary tubercle at the time when the Insurance Act was passed.

Yorkshire.

Arrangements are still incomplete in the East and North Ridings. In the West Riding the intention is to erect two sanatoria of 150-200 beds. The land for the first has been bought near Ben Rhydding (140 acres). On this will be erected a sanatorium, a school for tuberculous children, and perhaps a convalescent home for discharged tuberculous patients who can recoup the county for the cost of their treatment by doing some work. A number of dispensaries are being started in various parts of the Riding. Bradford, Halifax, Leeds and Sheffield are making independent arrangements. Many of the institutions in the list on page 185 are only temporary substitutes for future sanatoria.

North Riding.

THE WENSLEYDALE SANATORIUM,

Aysgarth, is surrounded by heather-clad spurs of the Pennine Range, twenty-five miles from Northallerton. *Grounds*: 3 acres. *Altitude*: 800 feet. *Soil*: Carboniferous limestone.

The *buildings* consist of a stone mansion with subsidiary buildings and wooden shelters. Walls decorated with washable distemper; floors covered with linoleum. Maximum number in a ward: Eight.

Staff: Two physicians, four nurses, etc.

East Riding.

THE HULL AND EAST RIDING SANATORIUM,

Withernsea, belongs to the Hull and Withernsea Convalescent Home. It is situated on the coast a few miles north of the estuary of the Humber, near the Convalescent Home.

Soil: Boulder clay with pockets of gravel. *Altitude*: 20 feet.
Grounds: 6 acres.

Buildings: A two-story building containing a large dining-room on the ground floor, and four large wards (one with four beds, the rest with eight beds each). On the south and west sides of each floor is a verandah on which beds can be placed in summer time.

Staff: Resident medical officer in the Convalescent Home adjoining.

Admissions: Apply to the Secretary, Hull Royal Infirmary. Payment for thirteen weeks in advance. Lower terms to residents within twenty-five miles of Hull, higher terms for those beyond. Only those with tubercle bacilli in sputum are admitted.

REFERENCE.—Bulstrode, *loc. cit.*, p. 544.

West Riding.

BADSLEY MOOR SANATORIUM,

Rotherham, is a transformed small-pox hospital belonging to the Corporation. A glass verandah has been added. There are two wards.

THE DEAN HEAD SANATORIUM,

Horsforth, seven miles from Leeds, belongs to Mrs. Oliver Firth. The *soil* is sandy. *Altitude*: 600 feet. *Grounds*: 3 acres.

Buildings: There are three wards of four beds each, four doubled-bedded rooms, and two with three beds apiece. *Heating* is by steam; *lighting* by gas.

Admissions: Men only are admitted. *Average stay:* Four months.

Staff: A medical officer, matron and nurse. Administration by the proprietress and medical officer.

ELDWICK SANATORIUM

Bingley, four miles from Bradford, consists of three blocks of cottages, rented and adapted to their present purpose by a Limited Company of ladies. *Grounds:* 3 acres. *Altitude:* Nearly 700 feet. *Buildings:* One room and one hut are single-bedded, the maximum number of beds elsewhere being three. *Heating* is by open fires, hot-water pipes in the recreation-room. *Lighting* by gas. Eight beds for children.

Admissions: Early cases amongst women or children. Last year sixty-five were admitted. *Average stay:* Four months.

Staff: Medical superintendent, Dr. Margaret Sharp. Resident medical officer, matron and two nurses.

Financial: Cost of maintenance, 23s. per head per week, of which food costs 11¼d. per day.

MORTON BANKS SANATORIUM,

near Keighley, belongs to the Keighley and Bingley Joint Hospital Board, and was originally a small-pox hospital. *Grounds:* 100 acres. *Soil:* Gravel over millstone grit. *Altitude:* 550 feet.

Patients admitted during 1912: Fifty-eight. *Average stay:* Three months. Women who are insured, or the dependants of the insured, coming from the West Riding, have the preference.

THE BRADFORD UNION SANATORIUM,

Eastby, near Skipton, is situated on open moorland, sheltered to the north and north-west by hills, to the east by pinewoods. The Duke of Devonshire allows the use of neighbouring woodlands. *Soil:* Carboniferous limestone. *Altitude:* 930 feet. *Grounds:* 7 acres, mostly moorland and garden.

Buildings: A stone-built two-story administration block with dining-room attached, and two one-story pavilions of wood and tiles with interior walls of Bruckner's fire-proof plate. The pavilions are

raised on piers, and between them, sunk so as to be entirely below the floor level of the pavilions, is the boiler-house. Over the centre of each pavilion is a nurses' room. The bedrooms are in a single row, with corridor to the north. In each building four are single-bedded, four two-bedded, one four-bedded, and two five-bedded. The windows are full-width casements, reaching nearly to the floors. The doors of the wards are nearly opposite the windows; there is also an unglazed window into the corridor. Cubic space, 1200 cubic feet. In the rear of the centre is a projection, open at the sides, containing an open staircase, bath- and douche-rooms, lavatories and earth-closets (four for each pavilion). There is no verandah. The corners are everywhere rounded; the floors covered with linoleum. *Heating*: By low-pressure hot-water coils; open fires in the administration block. *Lighting* by electricity. The laundry and disinfection are done on the spot.

Staff: Resident medical officer, matron, two nurses, three maids and two men.

Admissions: Apply to the Clerk, Bradford Union. Patients from subscribing Boards of Guardians admitted free.

Financial: The land cost £570. Estimated cost for fifty-two beds: £10,000. Cost of maintenance: £1 14s. 6d. per head per week, without interest on loan.

REFERENCE.—Bulstrode, *loc. cit.*, p. 530.

BIERLEY HALL HOSPITAL FOR TUBERCULOSIS,

near Bradford, belongs to the City Corporation.

It is *situated* in 40 acres of ground, wooded with beech, birch, and oak trees, on the side of a hill. *Soil*: Shale. *Altitude*: 525 feet.

Buildings: Originally a small-pox hospital, altered and added to in 1912. There are an administrative department containing the matron's rooms and those of the nurses and servants, kitchen, store-rooms and dispensary; two pavilions for patients, a large laundry and a small mortuary.

The permanent pavilion has two wards, for the two sexes; no single-bedded rooms, maximum number of beds to a ward, thirteen.

A verandah surrounds the building ; French windows, wide enough for beds to pass through, open on to this verandah from the wards. Cross-ventilation ; *heating* by slow combustion stoves ; *lighting* by outdoor incandescent lights. The temporary pavilion is similar. Patients rest on Ilkley couches. Graduated labour is employed, and sometimes tuberculin. Three beds are used as observation beds.

Patients admitted in six months : 76.

Staff : Matron, sisters, staff nurses and probationers. Administration by the Chief Tuberculosis Officer.

THE LEEDS TUBERCULOSIS ASSOCIATION

has an out-patient department in Leeds, a sanatorium for slight cases at Gateforth Hall, a home for advanced and febrile cases at Armley House, an agricultural colony in connexion with the sanatorium, and an After-care Committee in Leeds.

THE LEEDS SANATORIUM,

Gateforth Hall, is situated three miles from Skipton, in the Yorkshire plain, about two miles from the river Aire. Originally a country house with 2000 acres of land, including a beautiful rose garden, flower and fruit gardens, woods and farm lands. This estate was purchased by the Leeds Corporation for sewage disposal, but was let instead to the Leeds Tuberculosis Committee, two of the farms being reserved for tenant farmers. *Station* : Hambleton, N.E.R. *Soil* : New red sandstone. *Altitude* : 70 feet.

Buildings : An old mansion in Georgian style, consisting of a central hall surrounded by a staircase, round which the various wards are grouped ; and of a wing which is at present occupied by the staff. There are also some shelters for use in bad weather.

Admissions : Leeds cases from the out-patient department in Leeds, admitted free ; others only on nomination to an endowed bed. Secretary, 37 Great George Street, Leeds.

Financial : Cost of maintenance, 3s. 1d. per head per day. Among the subscribers are several Boards of Guardians, the Leeds Corporation, Leeds Work-people's Hospital Fund, the York branch of the National Association for Prevention of Consumption, the

Leeds Consumptives' Aid Association, and the Leeds Industrial Co-operative Society.

THE LEEDS HOME FOR ADVANCED CASES OF CONSUMPTION, Armley House, Gott's Park, is on the outskirts of Leeds, occupying the highest ground on the way to Bramley. It was originally a country mansion with 70 acres of ground.

Staff: Resident medical officer, matron, nurses, etc.; three visiting physicians.

Admissions: See Gateforth Hall.

Financial: The house and grounds are rented at £150. Cost of maintenance, 2s. 11d. per head per day. Subscribers pay £70 per annum for a bed.

REFERENCE.—Bulstrode, *loc. cit.*, p. 540.

Sheffield

has three hospitals used as sanatoria, in addition to portions of two Poor Law Hospitals. There is a Municipal Dispensary under the Medical Officer of Health. It is proposed to establish a school for crippled children and a residential school for forty tuberculous children. The more advanced cases are admitted into the Winter Street Hospital. In the other municipal hospitals patients are admitted for a month's educational course.

THE SHEFFIELD UNION SANATORIUM

is situated within the city boundaries, on dry soil over shale, about 600 feet above sea level. It consists of pavilions of the Union Hospital, together with additions, which in the case of the men form a permanent structure, while for the women and children they consist of shelters in the grounds. Maximum number of beds in a ward is twelve. One side of the ward is partly composed of wire gauze. *Heating* is by Shorland stoves. *Lighting* by gas.

Cost of maintenance (whole hospital), 16s. 10d. per head per week, of which 5s. 3d. is for food.

Total cases of pulmonary tuberculosis admitted in 1912: 355.

Lancashire.

Apart from the large boroughs which have made their own arrangements, temporary arrangements have been made to receive the

county cases of pulmonary tubercle in three of the fever hospitals, belonging to the Bury and District Joint Hospital Board, and the Wilkinson Sanatorium of the Bolton Convalescent Home. Beds may also be secured at High Carley Hospital of the Ulverston Joint Hospital Board (fifty), in fresh pavilions at the Wigan and District Joint Small-pox Hospital at Orrell (fifty), at the Elswick Small-pox Hospital of the Fylde, Preston, and Garstang Joint Hospital Committee (about fifty) and other isolation hospitals.

Cases approved for sanatorium treatment will be sent to the Westmorland Sanatorium at Meathop near Grange, where forty beds have been secured for the county.

By virtue of a private Act of Parliament the magistrates have the power at St. Helens of compelling residence in a sanatorium or hospital for not more than three months, if the Medical Officer of Health certifies that any person is suffering from pulmonary consumption in an infectious state and has unsuitable lodgings in which spread of infection cannot easily be prevented.

The county is to be divided into eleven dispensary districts.

THE AITKEN SANATORIUM,

Holcombe Brook, Ramsbottom, is situated 800 feet above sea level. *Soil*: Mostly rock, clay and slate. *Grounds*: 11½ acres, of which six are cultivated, the rest woodland. The *buildings* accommodate forty men and twenty women, twenty in shelters, the rest in rooms or wards chiefly containing four or eight beds. *Heating* by hot-water radiators. *Lighting* by electricity.

Staff: Matron, sister, three nurses and probationers, ten female and four male servants, under a medical superintendent.

Patients admitted in 1911, 104; in 1912, 96.

Average stay: Three to eight months.

Financial: The house and grounds were a gift; the adaptation cost £7000. Six additional acres purchased for £250. Cost of maintenance, 28s. to 30s. Cost of food only £1040.

THE FLORENCE NIGHTINGALE HOSPITAL,

Bury, is a fever hospital which has been converted for the reception of tuberculous patients. Two wards, each with a large balcony,

and two side rooms, are used for advanced cases. *Grounds* : 14 acres. *Heating* by steam and open fires. *Lighting* by electricity.

AINSWORTH HOSPITAL,

Bury, originally built for small-pox cases, is being used for tuberculous patients. Three pavilions, with thirty-five beds. *Grounds* : 51 acres.

Liverpool

possesses a Hospital for Consumption and Diseases of the Chest with thirty beds. Two of the isolation hospitals—the Park Hill Infectious Diseases Hospital at Dingle, and the Fazakerley Hospital—have set aside beds for tuberculous cases. The Park Hill Hospital will be devoted entirely to cases of pulmonary tuberculosis. At the Fazakerley Hospital wards with 250 beds for the same purpose will be built. The Heswall Sanatorium was the first Poor Law sanatorium to be erected ; it belongs jointly to the three Poor Law Unions of Liverpool and Birkenhead. There is a sanatorium for Liverpool cases at Kingwood in Delamere Forest.

In addition to the out-patient department of the Chest Hospital, two other dispensaries are to be established, in the north and south of Liverpool respectively.

THE FAZAKERLEY HOSPITAL,

Liverpool, is situated in an airy elevated part of the city. Originally a fever hospital ; twenty-four of the beds were set aside in 1907 for the reception of cases of tuberculosis, a number subsequently increased to eighty. Cases of surgical as well as pulmonary tuberculosis are received, in special wards and bungalows. The *grounds* (100 acres) consist of lawns and park with trees and meadows and cultivated land. *Soil* : Sandy. *Altitude* : 100 feet.

Buildings : The pavilions for tuberculous cases are of one story, and project southwards from a common corridor, each ending in a verandah glazed at the sides but open to the south. There are six wards as well as outside sleeping shelters. There are six single-bedded rooms ; maximum number of beds in a ward, twelve. Ventilation is aided by electric fans. *Heating* is by open fires in the centre of each ward. *Lighting* by electricity.

Staff: Includes three medical officers.

Patients admitted in year ending 31 December, 1912: 250.

Average stay: Three months.

THE LIVERPOOL CONSUMPTION HOSPITAL,

Mount Pleasant, rebuilt in 1904; with a Research Laboratory, out-patient department and wards with thirty beds, has an affiliated sanatorium in Delamere Forest (see Cheshire).

REFERENCE.—Bulstrode, *loc. cit.*, p. 410.

Manchester and Salford.

Manchester has a Hospital for Consumption and Diseases of the Chest with an out-patient department in Hardman Street, Deansgate, and an in-patient department at Bowdon in Cheshire. Manchester and Salford also send their insured cases to the Drinkwater Park Hospital, and to the Crossley Sanatorium in Delamere Forest. For the description of the Bowdon and Crossley institutions, see Cheshire.

There is a Country Home for phthisical school-children from Manchester at Higher Summerseat, near Bury, 500 feet above the sea level, presented to the City by Mr. C. H. Grundy of Bury.

For the provision of sanatorium benefit under the Insurance Act it is proposed to increase the accommodation at the Baguley Sanatorium to 300 beds for moderately advanced cases, and to support sixty-two beds at the Crossley Sanatorium for early cases. The Abergele Sanatorium, which at present belongs to the South Manchester Guardians, is also to be taken over by the Corporation. A site of 65 acres at Rab Top Farm, Marple, has been offered for a permanent sanatorium ("Brit. Med. Journal," 17 May, 1913). Two special committees are to be formed, the one medical, to devise means of discovering early cases, the other representative of various bodies, to deal with the social and philanthropic side.

THE DRINKWATER PARK HOSPITAL,

Prestwich, Salford, belongs to the Salford Corporation, being originally a small-pox hospital. *Grounds*: 50 acres. *Soil*: Sandy. *Altitude*: 150 feet.

Buildings: Four wards of fifteen beds apiece, opening on to verandahs. *Heating* by coke stoves (rarely used). *Lighting* by gas.

Staff: A resident medical officer, matron, and four nurses.

Financial: Alterations cost £350.

It is proposed to admit patients for eight weeks in order to start tuberculin treatment, afterwards continuing the treatment at a dispensary.

THE STRINESDAILE MUNICIPAL SANATORIUM,

near Oldham, is situated on moorland 1000 feet above sea level. There are two wards set aside for tuberculosis, each with nine beds. *Lighting* is by gas. Inhabitants of Oldham are admitted free or for nominal fees; insured persons at 30s., Poor Law cases at 35s., outside cases at 42s.

Administration is by the Medical Officer of Health.

St. Helens

possesses a tuberculosis hospital (Eccleston Hall) and a Borough Sanatorium at Peasley Cross. Five beds have been reserved at Bourne Castle (see Worcestershire). There is a tuberculosis dispensary. Children with tuberculosis are sent to the West Kirby Children's Sanatorium (see Cheshire) and the North of England Children's Sanatorium, Southport.

ECCLESTON HALL,

Shatto Heath, St. Helens, is situated just outside the city in 21 acres of ground. *Altitude*: 180 feet. *Soil*: New red sandstone.

Buildings: Contain forty-three beds in wards (maximum fourteen per ward, three in single-bedded ones) and eight in single-bedded shelters. *Heating* is by open fires. *Lighting* by electricity.

Staff: Resident medical officer, seven nurses, seven indoor and one outdoor servant.

Financial: Cost of erection about £4500; of land about £9500. Cost of maintenance, 27s. per week, of which food amounts to £1. Residents in St. Helens are admitted free.

THE WESTMORLAND CONSUMPTION SANATORIUM,

Meathop, Grange-over-Sands, owes its existence mainly to the exertions of Drs. Rushton Parker and Paget-Tomlinson. Originally

a convalescent home, to which additions have been made, it now consists of a convalescent home standing in 25 acres of ground, and a sanatorium adjacent in 30 acres of land, both to some extent under the same administration, but with distinct domestic and nursing staff. The medical superintendent, assistant physician, engineer and gardeners are common to both. The water supply and disinfecting and lighting station also serves both institutions, but each has a separate bacterial sewage disposal plant.

Situation : About a mile from the sea, overlooking Morecambe Bay, surrounded by woodland and pasture. *Soil* : Limestone. *Altitude* : 110 feet. *Grounds* are partly garden, partly cultivated land, moorland or woodland. A large croquet lawn and a bowling green have been made.

Buildings : The original sanatorium building is a two-story stone structure used for administration, to which have been added wings of one story containing large wards for eight beds apiece. There are also a number of four-bed "pagoda" shelters, a large wooden dining-room, a stone-built nurses' home, and a recreation pavilion for men. Another recreation room for women and a workshop for men are being added. There is also a home for advanced cases. Part of the main block has been converted into two dispensary departments for the two sexes; and there is also a separate children's section. The doctor's house and gardener's lodge are in the grounds of the Convalescent Home. Recently a large new kitchen has been built, and the dining-room enlarged. The *pagoda shelters* consist of nearly square double wooden structures with large windows on all sides pivoted through their centres. A ventilating space is left all round under the eaves, and a louvred ventilator placed at the peak of the roof, which slopes in all four directions. The rooms are larger above the bed-level than at the floor-level, the overhanging part being supported on wooden buttresses. *Cubic space* in the large wards, 900 cubic feet; in the shelters, 500 cubic feet. *Heating* in the main building by hot-water pipes; none in the shelters. *Lighting* by electricity.

Staff : Two resident physicians, matron, etc.

Statistics : 333 patients were admitted during 1912, of whom 14 per cent were from Westmorland.

Treatment includes tuberculin, graduated labour, Swedish breathing exercises, and games. There is an air rifle club.

Financial: Capital expenditure in twelve years for extensions, including £1200 for the original outlay by Dr. Paget-Tomlinson, amounted to over £26,000, or about £195 per bed. Average weekly cost of maintenance, 32s. per bed. Most of the beds have been leased to the Westmorland County Council (fifteen) and various Corporations, Boards of Guardians and Societies in Lancashire and elsewhere. The beds are mostly let at £70 to £80; a few at £90. Private cases are admitted at £2 2s. per week, extra cases from the Westmorland County Council at 30s.

The *management* in future will be in the hands of the county medical officer, the medical superintendent (as tuberculosis officer) and a committee of management of twenty, half appointed by the County Council, the rest by the Insurance Committee and the present committee.

REFERENCES.—Bulstrode, *loc. cit.*, p. 490; "Brit. Journal of Tuberculosis," vi., 4 Oct., 1912.

Cheshire.

There are tuberculosis dispensaries, either in existence or in preparation, at Chester, Birkenhead, Stockport, Wallasey, Warrington and Stoke-upon-Trent. There is a private one at Runcorn under Dr. H. E. Annett.

Most of the sanatoria in the county are mainly intended for patients from Liverpool or Manchester.

THE LIVERPOOL SANATORIUM,

Roughhill, Kingswood, is situated in pretty, wooded country between Frodsham and Helsby, in Delamere Forest. It occupies one of the highest points in Cheshire, and commands views of Eaton Hall (the seat of the Duke of Westminster), the city of Chester, the river Mersey, and (on a fine day) Snowdon and Moel Famau. *Stations*: Frodsham, Mouldsworth. *Soil*: Upper Trias (sandstone). *Altitude*: 490 feet. *Grounds*: 45 acres, secured on a long lease from the Crown, partly pinewoods.

Buildings: Consist of a main block and a number of detached

bungalows, etc. In the main block, on the ground floor, are the medical officer's and matron's quarters, and behind the corridor (which ends in the lavatories) the consulting rooms and laboratory. On the first floor are a limited number of bedrooms for patients, on the south side of the corridor ; in the attics, quarters for the staff. In front of the building, with a south or south-west aspect, is a long balcony on the first floor, and in the centre a short verandah. Running back from the centre of the building is a passage leading to the dining-hall, and beyond it the kitchen department, with servants' bedrooms. Somewhat behind each end is a three-story sanitary pavilion cut off by cross-ventilation from the rest of the building. A glass-covered verandah is placed in front of the main entrance, and on either side of it. The wards are ventilated by casement windows with fanlights. *Cubic space* per bed : 1000 cubic feet. Most of the patients are accommodated in small detached bungalows, each containing from four to six bedrooms, with bath-rooms, etc. All the rooms are built with rounded angles and corners, free from projecting mouldings. There is a separate house for the medical officer. *Heating* by hot-water pipes. *Lighting* by electricity.

Patients discharged during 1911 : 164.

Average stay : Eighty days.

Financial : The building was erected chiefly through the generosity of Lady Willox and Mr. W. P. Hartley. Cost per bed, £375. Cost of maintenance, £1 17s. per week.

REFERENCE.—Bulstrode, *loc. cit.*, p. 343.

THE WEST DERBY, LIVERPOOL AND TOXTETH PARK JOINT SANATORIUM,

Heswall, Cheshire, overlooks the estuary of the Dee and the Welsh hills. It is well sheltered to the east.

Soil : Sandstone (Lower Trias). *Altitude* : 656 feet. *Grounds* : 15 acres, chiefly heather-land.

Buildings : A two-story brick building with administration in the centre, and wings for patients forming a very open angle with one another, facing south. Running north is a corridor leading to the dining-room, and thence to the kitchen department. The

wards are on the south side of a corridor ; two sanitary annexes on the north side separated by cross-ventilation. Two three-bedded wards, six single-bedded, on either side. In front of each wing is a glass-roofed verandah ; in front of the centre, on the first floor, a sheltered balcony. There is a separate staircase for each wing. Ventilation by casement windows : *Cubic space* : 1000 cubic feet.

Staff : Visiting medical officer, John B. Yeoman. Resident staff includes three nurses, six maids, and a charwoman.

Financial : Supported by the Boards of Guardians from the Poor Rate. Cost of erection, including land, £12,000. Cost per bed, without land, £338. Cost of maintenance, 16s. 9d., or with establishment charges, £2 8s. 3d. per week per head.

REFERENCE.—Bulstrode, *loc. cit.*, p. 277.

THE MANCHESTER HOSPITAL FOR CONSUMPTION AND DISEASES OF THE THROAT AND CHEST,

Bowdon, is placed in a garden of three-quarters of an acre, but is now surrounded by shops and factories. Large verandahs have been placed round the hospital and shelters in the garden. There are four wards : cubic space, 2000 cubic feet. Ventilation is by open windows and an extractor. *Heating* by hot pipes. *Lighting* by electricity. The hospital has an out-patient department in Manchester.

REFERENCE.—Bulstrode, *loc. cit.*, p. 275.

THE CROSSLEY SANATORIUM,

Kingswood, Cheshire.

Situation : In Delamere Forest. *Stations* : Frodsham, Mouldsworth. *Soil* : New Red Sandstone. *Altitude* : 480 feet. *Grounds* : 66 acres, mostly woodland, 10 acres cleared.

Buildings : A three-story block with a south aspect, containing wards to the south of the corridors, sanitary pavilions to the north, cut off by cross-ventilation ; from this runs a corridor to a separate block to the north, containing dining-room, nurses' dining-room, and kitchen quarters, a fine chapel, and the administrative offices. Still farther north, another block with laundry, disinfector, engine- and boiler-house, and stables. In another building is a

sputum sterilizing room, bacteriological laboratory, and autopsy-chamber. There are also cottages for attendants, and a nurses' home with forty-six rooms—more than is at present needed. Consulting rooms, X-ray room, douche-room and cloak-rooms in basement of main block. Also throat rooms, an operating theatre, and large day rooms at the ends of the wings. Of the wards, four are six-bedded, ten are four-bedded, one has two beds, twenty-four are single-bedded. Windows large, with casements, opening on to the balconies. *Cubic space*: 1800 cubic feet. There is a complete hydrotherapy installation in the basement. *Heating* by hot-water radiators. *Lighting* by electricity. Double generating plant, actuated by steam in winter, by gas in summer.

Terms: Patients sent in from the Out-patient Department of the Manchester Consumption Hospital are admitted free. Thirty-six beds are reserved for paying patients from any part of the country. These pay £3 3s. for a single-bedded room, £2 2s. or £2 12s. 6d. in wards with six or four beds. *Apply to* the Secretary, Consumption Hospital, Hardman Street, Manchester.

Staff: Resident medical officer, G. Heathcote, L.R.C.P.Ed. The management is chiefly in the hands of a matron.

Financial: The sanatorium was given to the Manchester Consumption Hospital by W. J. Crossley, and with the grounds is said to have cost £80,000. The Manchester Corporation contributes £1000 annually. Cost of maintenance about £7000. Cost of food (including staff) 1s. 10d. per head per day. Total weekly cost: £1 13s. per patient.

REFERENCE.—Bulstrode, *loc. cit.*, p. 348.

CHAPTER XXXV.

THE MIDLAND COUNTIES.

INCLUDING Shropshire, Herefordshire, Worcestershire, Staffordshire, Warwickshire, Derbyshire, Nottinghamshire, Leicestershire, Northamptonshire, Rutlandshire, and Lincolnshire.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Admitted.	Beds.
SHROPSHIRE—					
King Edward VII Mem. San., Broseley	1911	25/, 30/, F.	—	E., m.	31
Salop Conv. and Surg. Home, Baschurch	—	—	—	E., w., c. S.	17 —
WORCESTERSHIRE—					
† Worcs. San., Knightwick	1902	30/ or F.	—	E.	34
† Upton-on-Severn Hosp.	—	—	Worcester Corp.	F. H.	8
† Newtown Hosp.	—	—	—	—	20
† The Mount, Bromsgrove	1910	25/, 30/	—	E., m., b.	45
Romsley Hill Home	—	—	Hosp. Sat. Fund	—	—
Midland O. A. San., Belbroughton	1901	30/, 42/, 84/	Dr. W. B. Knobel	E., m.	18
Welland San.	—	—	—	E., w.	9
Oldbury and Smethwick Hosp.	—	—	—	—	10
Bromsgrove Isol. Hosp.	—	—	—	—	12
Stourbridge and Halesowen Hosp.	—	—	—	—	8
Stourbridge and Halesowen Hosp.	—	—	—	—	12
STAFFORDSHIRE—					
Moseley Hosp., Wednesbury	1913	—	—	E., m.	40
† S. Staffordshire Inf.	—	—	—	A., S.	—
N. Staffordshire Inf.	—	—	—	A., S.	—
Smethwick and Oldbury J. H.	—	—	—	F. H.	36
† Burton-on-Trent Hosp.	—	—	—	F. H.	—
WARWICKSHIRE—					
† Birmingham Salterley Grange	—	—	See Gloucestershire	—	—
† Birmingham Yardley Rd. Hosp.	—	—	—	A.	215
† Birmingham West Heath Hosp.	—	—	—	A.	112
† Tuttle Hill San., Nuneaton	—	—	—	A.	7
County San. (Romsley)	in con.	—	—	E.	20
Woodlands San.	1910	—	For Birmingham	c.	—

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
DERBYSHIRE—					
† County Boro' San.	—	—	—	P. L.	26
Ashover San., Chesterfield	1909	2½-5 gs.	Dr. Ida E. Fox	E.	10
County San.	in	—	—	E.,	72
	prep.	—	—	A.	96
Chesterfield and N. Derby	1859	—	—	—	(80)
Hosp.					
† Home of Rest, Derby	—	—	—	—	—
Derbyshire Hosp. for sick	1877	—	—	c.	(40)
children					
Derbyshire Rl. Inf.	1810	—	—	—	(229)
Ilkeston Cottage Hosp.	1884	—	—	—	(30)
NOTTINGHAMSHIRE—					
† Ransom San., Mansfield	1901	31/	—	E.	31
Gringley on the Hill Hosp.	—	—	R. G. Hogarth	S., c.	—
Nottingham Gen. Hosp.	—	—	—	—	24
Worksop Union Inf.,	—	—	—	P. L.	ward
Kilton Hill					
† Nottingham San., Bag-	—	—	Dr. Boobyer	—	—
thorpe [ham					
Bulwell Hosp., Notting-	—	—	Notts Corporation	—	60
LEICESTERSHIRE—					
Leicester Sanatorium	1913	—	—	F. H.	40
† „ Corp. Isol. Hosp.	—	—	—	—	25
NORTHAMPTONSHIRE—					
† Northants San., Creaton	—	—	—	E.	36
Kettering Union San.	—	—	—	P. L.	20
Northampton Gen. Hosp.	—	—	—	S., c.	—
Kettering Gen. Hosp.	—	—	—	S., c.	—
LINCOLNSHIRE—					
† Lincoln City Hosp.	—	—	—	—	16

For signs and contractions, see p. 187.

Shropshire.

THE KING EDWARD VII MEMORIAL SANATORIUM,

Shirlett, near Broseley, belongs to the local Antituberculosis Association for Shropshire and the Hundred of Maelor. It is situated in well-wooded country, about sixteen miles from Shrewsbury. *Grounds*: 22 acres. *Altitude*: 700 feet. *Soil*: rock and clay (millstone grit). *Station*: Much Wenlock, three miles.

Buildings: A central portion consisting of dining-hall with kitchen behind, leading to a two-story administration block. On either side are wings forming an obtuse angle with the centre, sloping somewhat northward. At the end of each wing is a nurses' room, which projects so as to overlook the front, and a lavatory pavilion which projects northwards. The wards, all on one floor,

are mostly two-bedded, one single-bedded room on either side next the nurses' room being provided with an open fireplace. Otherwise there is no *heating* excepting in the dining-hall, where also an open fire can be lit if necessary. Ventilation is by open windows and permanent openings opposite, which cannot be closed. There are thirty beds in the sanatorium; the rest are in shelters of various kinds. *Electric lighting*.

Staff: Resident medical officer, matron, two nurses, four maids, two more for laundry, engineer and boy.

Patients admitted in 1912: Seventy-four.

Average stay: Five months.

Financial: Cost of erection, £11,000. Land is rented at the nominal rent of £7. Cost of maintenance in first year £1 7s. 9d., of which food cost 11s. 1d.

Herefordshire.

There are nine tuberculosis dispensaries in this county; ten beds have been reserved at the Cranham (Cotswold) Sanatorium.

Worcestershire.

There are eight hospitals and sanatoria receiving cases of pulmonary tuberculosis in this county, with a total of 158 beds, in addition to a private sanatorium with thirty beds. Thirteen local branch Tuberculosis Dispensaries have been established.

THE WORCESTERSHIRE SANATORIUM,

Knightwick, belongs to the Worcestershire Association for Prevention of Consumption, and was opened chiefly through the exertions of Drs. Fosbrook and H. E. Dixey.

It is *situated* on the western slopes of the Ankerdine Hills, overlooking the valley of the Teme, and sheltered by woodland to north and east. *Grounds*: 30 acres. *Soil*: Upper Silurian rocks. *Altitude*: 310 feet.

Buildings: A pre-existing house is used for administration. Two wooden pavilions on brick bases have been added. A few patients in the Lodge and in shelters. Separate engine-house in what was formerly coach-house and stables.

Each pavilion contains eight rooms ($10 \times 10 \times 8$ feet) opening on to a covered 7-foot verandah in front and a 4-foot corridor behind; also bath-room, three lavatory basins and two W.C.'s. All rooms single-bedded. Ablutions in lavatories. *Ventilation* by French windows and by Shorland's ventilators (grids over windows leading to shafts in the roof). *Cubic space* per bed: 800 cubic feet. *Heating* by hot-water radiators. *Lighting* by electricity.

Financial: Cost of alterations and installation, £2292. Mr. J. Dangerfield of Bilston offered the house and grounds for five years at a yearly rental of £1. The capital was raised by subscriptions from the Worcester County Council (£300), Dr. Corbett (£1000), and others. Cost per bed, £100. Maintenance by subventions from the Worcester Board of Guardians, private business firms, Friendly Societies, and local Sanatorium Committees at Malvern, Evesham, Worcester, Oldbury, and Redditch. Weekly cost per patient, 30s.

Staff: Secretary, resident medical superintendent, matron, two nurses, three maids, three outside men.

Treatment: Patients usually sleep in the verandah. Light work is done by them.

REFERENCE.—Bulstrode, *loc. cit.*, p. 524.

THE MOUNT SANATORIUM,

Fairfield, near Bromsgrove, is a private institution for poor people, belonging to the Misses Powis.

It is situated in $4\frac{1}{2}$ acres of ground, sloping south, and commanding distant views of the surrounding wooded country. *Soil*: Gravel and sand (Upper Trias). *Altitude*: 600 feet.

Buildings: Consist of administration block, day rooms and chalets. There are six single-bedded rooms; maximum number in a ward, five. *Heating* by stoves in day rooms. *Lighting* by oil lamps.

Staff: Visiting physician, matron, two nurses, etc. A schoolmistress for children.

BOURNE CASTLE,

Belbroughton, is *situated* five miles from Stourbridge, on a breezy upland, commanding extensive views to the south and west. The

pine-clad hills of Great and Little Fairley and the Lickey and Clent Hills shelter it to the east and north. *Stations*: Hagley, Bromsgrove. *Grounds*: 25 acres, largely pasture and agricultural land. *Altitude*: 500 feet. *Soil*: Gravel (Upper Trias).

The house is a picturesque building facing south, with lofty rooms opening on to the terraces by French windows. The dining-hall extends the whole width of the building, and has four large French casements.

Patients are quartered in eighteen chalets, some of which revolve while others open on every side. These have no heating apparatus beyond oil lamps occasionally used, nor electric lighting, but are otherwise well adapted to their purpose. They are connected with the castle by electric bells. There are special chalets for bathing purposes and for earth-closets.

Among the amusements provided are tennis, archery, croquet and trout-fishing. There is an X-ray department.

Staff: Resident medical director, matron and two nurses, etc.

Staffordshire.

The Administrative County of Stafford with the County Boroughs of Wolverhampton and Dudley have been constituted a Joint Authority for dealing with Tuberculosis in the County of Stafford. The present arrangements are provisional.

Warwickshire.

In this county separate arrangements have been made for the City of Birmingham, which possesses a sanatorium in Gloucestershire and two hospitals for advanced and educational cases.

For the County of Warwickshire it is proposed to erect a sanatorium and hospital beds to the number of twenty, with ten dispensaries. The City of Coventry may join in this arrangement. For the present there are seven beds in an Isolation Hospital at Tuttle Hill, Nuneaton.

There is a dispensary in Birmingham in connexion with the Yardley Road Hospital; tuberculin is freely used there.

For description of Salterley Grange, see p. 246.

Nottinghamshire.**THE NOTTINGHAM SANATORIUM,**

Mansfield, belongs to the Nottingham Association for Prevention of Consumption, and owes its existence largely to the advocacy of the late Dr. W. B. Ransom.

Situation : At the southern end of Sherwood Forest, on the slope of the pine-clad Ratcher Hill, facing a wide expanse of grass and heather, and sheltered to the north by pines, oaks and beeches.

Grounds : 50 acres, half woodland, given by the Duke of Portland.

Altitude : 470 feet. *Soil* : Sand over Magnesian Limestone.

Buildings : Of wood on brick base, with galvanized iron roof. Central two-story portion for administration, projecting north. Wings of one story, with cloak-room, single-bedded ward, bath-room and pantry next the centre, large wards at the ends, glass-roofed verandah on the south side, and part of the north side, and sanitary pavilions to the north. There are other outbuildings for electric lighting, laundry, stabling, etc., and a few sleeping shelters. The rooms are lined with composition boarding, joints covered with a semicircular beading, and have floors covered with linoleum and French windows. Extraction shafts in each large ward. *Cubic space* per bed : 1650 feet in large wards. *Heating* by low-pressure pipes and radiators ; open fires in matrons' and doctors' sitting-rooms. *Lighting* by electricity.

Financial : Cost of erection and installation, £5300. The capital was raised by subscriptions, the Corporation of Nottingham subscribing £1000, the Town Council of Mansfield £200. Cost per bed (30 beds), £177. Maintenance is by contributions from the Corporations of Nottingham, Newark and Mansfield, the Basford Board of Guardians, private firms and trade societies, and others. Annual cost per patient, £75.

REFERENCE.—Bulstrode, *loc. cit.*, p. 450.

Leicestershire.

There are three dispensaries in this county, one of which has four beds for observation.

The County Borough of Leicester has made separate arrangements. Sanatorium cases are received in the Isolation Hospital. There is a well-equipped dispensary. A permanent sanatorium with hospital section is under consideration.

CHAPTER XXXVI.

THE EASTERN COUNTIES,

INCLUDING Norfolk, Suffolk, Essex, Cambridgeshire, Huntingdonshire, Bedfordshire, and Hertfordshire.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Patients Admitted.	Beds.
NORFOLK—					
Mundesley San.	1899	5 gs.	Dr. S. Vere Pearson	E.	34
Fritton San., Long Stratton	1901	2 gs.	Dr. A. Lewthwaite Dr. Annie McCall	E.	10
† Kelling San., Holt	1903	30/ or F.	Dr. J. I. W. Morris	m. w.	52 20
Children's San., „	1906	—	—	c.	40
SUFFOLK—					
† East Anglian San., Nayland	1900	4-6 gs.	Dr. Jane Walker	E., M. c.	35 12
† Maltings Farm San., „	1901	40/, 30/	„	m.	54
† „ „ „ „	1904	21/	„	w.	31
„ „ Child. San., Nayland	proj.	—	—	—	—
„ „ Hosp. San., „	proj.	—	—	—	—
† Ipswich Boro' Isol. Hosp.	—	—	—	E.	28
† „ „ San.	—	—	—	—	65
† Chilton Hill House San.	—	—	—	w.	18
ESSEX—					
† Alfred Boyd San., Gt. Baddow	—	30/, 42/	Dr. Lyster	w.	20
Merivale San., Danbury	1905	4-5 gs.	Dr. D. H. N. Marrett	—	20
CAMBRIDGESHIRE—					
Addenbrooke's Hosp.	1719	—	—	G. H.	(148)
BEDFORDSHIRE—					
† Daneswood, Woburn Sands	1903	F.	—	Jews, m. „	14 10
Beds County Hosp., Beds	—	—	—	G. H.	(100)
Bute Hospital, Luton	—	—	—	G. H.	(40)
HERTFORDSHIRE—					
† Chantrey House San., Hatfield	—	—	—	—	9
† Children's San., Harpenden	1910	7/6, 15/, 20/	Dr. T. N. Kelynack	b. g.	16 34

For signs and contractions, see p. 187.

Norfolk.

THE MUNDESLEY SANATORIUM,

Cook's Hill, Mundesley, was founded by Dr. F. W. Burton-Fanning. It is situated seven miles from Cromer, about a mile from the north coast of Norfolk, sheltered to the north and east by a small ridge of hill, and overlooking agricultural land to the south. There are golf grounds between the sanatorium and the sea. *Grounds*: 30 acres, partly garden, partly cornfields. *Soil*: Deep sand overlying chalk. *Altitude*: 100 feet.

Buildings: A good-looking wooden two-story structure, with glass verandah along south side (fig. 6). The entrance is at the eastern end. On the ground floor are seven bedrooms for patients, a large dining-room and drawing-room, mostly facing south. A wide corridor behind these runs the whole length of the building. Behind it at the western end are the kitchen block and the office; at the eastern end the medical officer's rooms. On the first floor are twelve bedrooms, nearly all on the south side. The bedrooms are of good size, with casement windows surmounted by fanlights. Above each bedroom door is another fanlight opening into the corridor. Bathrooms, lavatories and earth-closets are to the north. The walls are papered; the floors, excepting in dining- and drawing-rooms, covered with linoleum which is curved upwards under a fillet on the walls. Some curtains and carpets are used. All the rooms are single-bedded. *Heating* is by hot-water pipes (in some rooms also by open fires). *Lighting* by electricity, produced in an engine-house to the north-east. The *water supply* is from a deep well. A bungalow with five rooms for convalescents lies up the hill, east of the engine-house. Nine well-constructed sleeping chalets, with windows on all sides, and special day-shelters of wood and glass are placed about the grounds.

THE KELLING SANATORIUM,

Holt, is situated in prettily wooded country a few miles from the north coast of Norfolk. *Grounds*: 30 acres. *Soil*: Gravel over chalk. *Altitude*: 200 feet.

Buildings: An ordinary two-story house is used for administration. Attached to this is a large dining-hall. Running north and

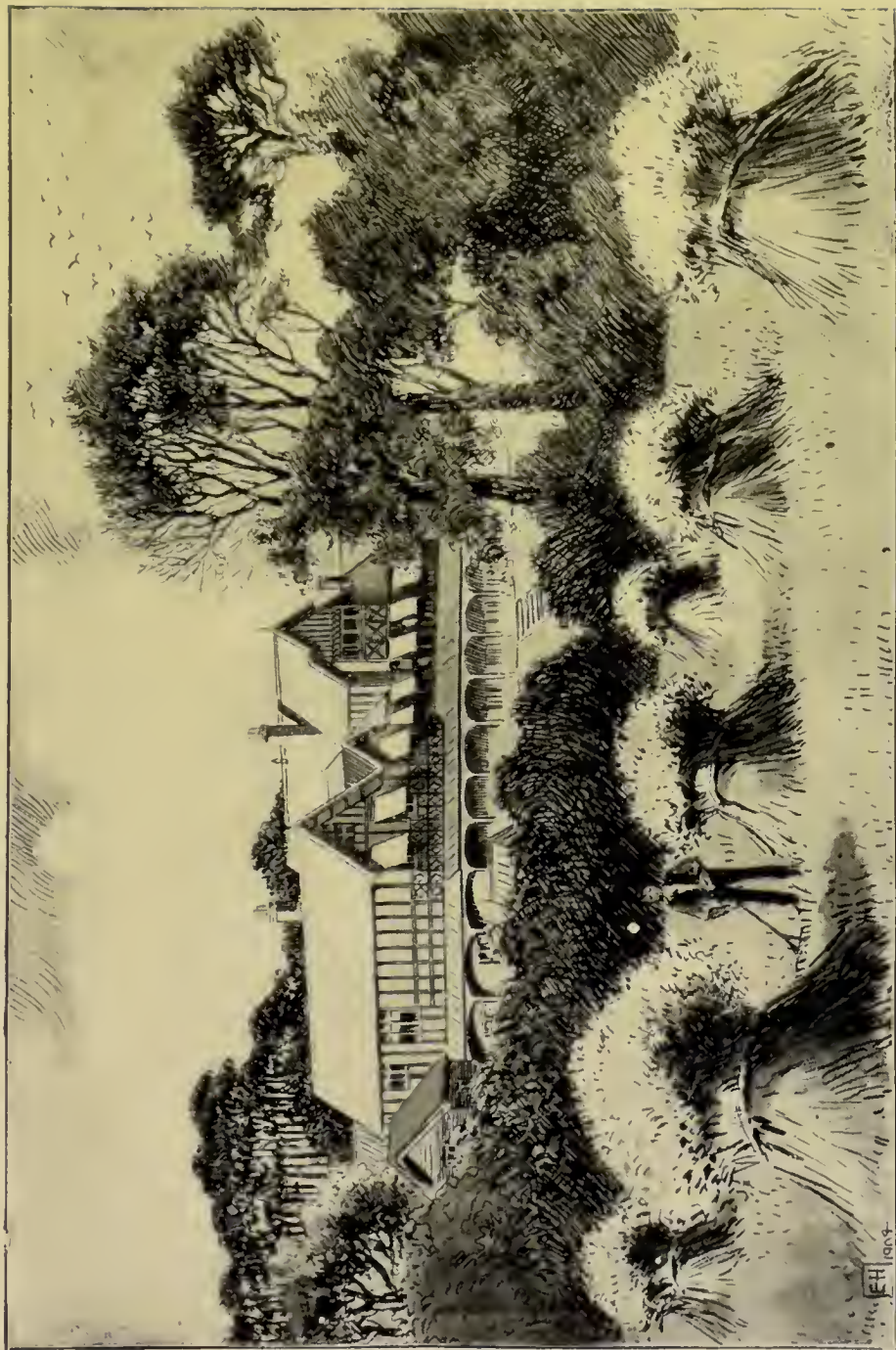


FIG. 6.—THE MUNDESLEY SANATORIUM

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south are one-story additions forming parts of two quadrangles. There is a separation wall between the eastern and western portions, which are used for the two sexes respectively. The women dine in a separate room near the men's dining-hall, and have separate day room and other arrangements. To the north-east is the doctor's house next the entrance, with gardener's cottage, workrooms, etc.; the acetylene lighting plant with coach-house and stables and destructor lying due north. The one-story pavilions have walls, ceiling, and floors of Mack slabs, finished inside with plastic material without joins or cracks, the corners all being rounded. The roof is of tiles, with wide over-hanging eaves. The outside walls are rough-cast. Each patient's pavilion contains beds for eleven patients, lavatory, two bathrooms, nurse's bed-sitting-room, and a small ward kitchen. Some of the wards are subdivided into cubicles by dwarf partitions 6 feet high; others are single-bedded. There is a 3-inch unclosable ventilating slit under the ceiling, and a similar one above the ceiling. Each two-bedded cubicle is 12 feet \times 11 \times 7 feet 3 inches, and has a 4-foot door space on the two free sides, closed by half-hatch doors, the upper portion being glazed. *Cubic space* per bed: 480 cubic feet. Connecting corridors are replaced by pathways under the projecting eaves. There are many revolving shelters in the grounds. *Heating* by hot-water pipes in some wards, by oil lamps in others. *Lighting* by acetylene gas. *Water supply* from an artesian well. *Sewage*: Earth-closets. Slopwater into cesspits, thence on to the land.

Staff: Resident medical officer, matron, and a nurse for every eight or ten patients.

Admission: Write to the honorary secretary of the Admission Sub-committee, Matlaske Hall, Norwich, for forms of admission. Only early cases admitted. The London Charity Organization Society send cases, amongst others.

Financial: The two original pavilions cost £1300. Cost per bed, patients' quarters only, £59 per bed; including administration, £200. Erected by private subscription, a large endowment fund being also raised in the same way. Patients doing work are paid according to a graduated scale, up to 5s. per week. Working patients cost about 15s. 6d. per week, all together about £1 9s.

Treatment: Systematic outdoor work is included. There is a

poultry farm, and basket-making is done, as well as other forms of light work. There is an After-care Committee.

REFERENCE.—Bulstrode, *loc. cit.*, p. 431.

Suffolk.

THE EAST ANGLIAN SANATORIUM

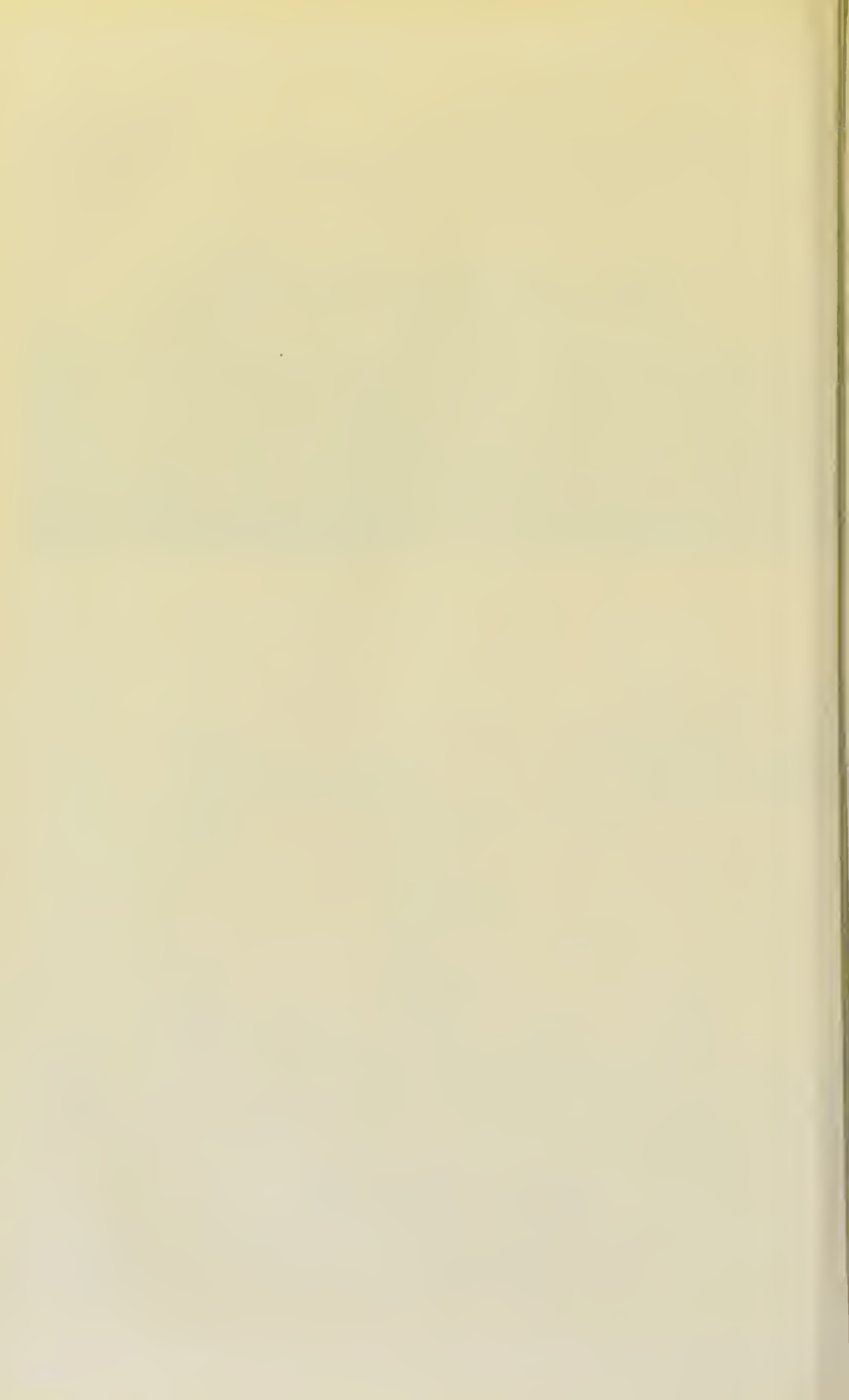
is the historical successor of other sanatoria started by Dr. Jane Walker from 1892 onwards at Downham, Denver, and Boxted.

It is *situated* seven miles from Colchester in the midst of agricultural land. *Grounds*: 140 acres, partly garden, partly meadow and farm land. *Soil*: Sand with Glacial Deposits overlying Tertiaries. *Altitude*: 260 feet. *Station*: Bures (G.E.R.), three and a half miles.

The *building*, which has two stories and attics, is in the shape of an inverted Y with very diverging limbs, one looking south-south-east, the other east-south-east. These limbs are but one room and corridor deep, and consist mainly of patients' bedrooms. At their junction is a central open-air gallery, behind which is the main staircase. Still farther north, in the stem of the Y, are, on the east side, two lavatories, the office, a visitors' room and a servants' hall; on the west side a nurses' room, the entrance hall, matron's room and an open-air lobby. The foot of the Y is formed towards the west by the dining-room and recreation-room, towards the east by the kitchen department. The corridor behind the patients' bedrooms has on the north two projecting pavilions containing earth-closets and bathrooms, and at the ends two rooms on each floor for the nurses. A central open-air gallery is found on both floors. Two rooms near the centre on the ground floor are for the medical officers. Verandahs have been purposely omitted from in front of the patients' bedrooms. These are about 16 ft. × 10 ft. The building is *heated* by low-pressure steam, and *lighted* by electricity. The engine-house is a little behind the eastern end of the building, near the kitchen department (figs. 7, 8).

There is a temporary children's department with a dozen beds in the grounds. A chapel has been built to the north of the sanatorium.

Staff: Dr. Jane Walker, 122 Harley Street, London (visiting physician), to whom applications should be made; a resident lady medical officer, matron, nurses, etc.



THE MALTINGS FARM SANATORIUM

is *situated* on hilly country, in the grounds of the East Anglian Sanatorium, from which it is separated by a high hill and valley. *Altitude*: 200 feet. The original farm *buildings* have been made use of, the barn being converted into a dining-room for both sexes, by tiling the roof, putting in large windows, and a concrete floor, and lime-washing the interior. An addition to the north side with separate entrance forms a chapel. The coach-house, cart-shed, and stables form the kitchen quarters, and separate the men's quarters from the women's. The *men's portion* is to the east, and consists of two bungalows with two-bed and four-bed cubicles, together with smaller shelters and a large tent.

The *women's portion* consists of a long one-story bungalow of wood on concrete pillars, containing cubicles for two patients each. These cubicles have folding doors back and front, arranged to give cross-ventilation. There are also openings above and below the ceiling which can never be closed. The interior is lined with match-boarding. The roof is of "ruberoid". At one end of this building is an observation ward for new arrivals, at the other end a day room. On the south side is a deep verandah on to which the beds can be wheeled. There is also a ward in the old farm-house. *Heating* apparatus has not been found necessary. *Lighting* is by electricity from the East Anglian plant.

Illingworth block. Another bungalow, intended for convalescent cases capable of regular work, lies farther west.

Admission: Apply to Dr. Jane Walker, 122 Harley Street, London, W.

Financial: The cost of the women's portion, with half the cost of the dining-room and kitchen quarters, amounted to £110 per patient, exclusive of land. Annual cost per bed: men, £58; women, £43, without reckoning depreciation. Arrangements have been made for considerable extensions, to include a hospital block and a children's sanatorium.

REFERENCE.—Bulstrode, *loc. cit.*, p. 462.

Essex.

MERIVALE,

Sandon, near Chelmsford, is situated in open country on the second highest point in Essex, about eight miles from the sea. *Grounds*:

6½ acres, chiefly meadowland. *Altitude* : 300 feet. *Soil* : Gravel over London clay.

Buildings : With the exception of the administration, the sanatorium consists entirely of chalets. These are formed of a skeleton of wood with single pitch roof of semi-transparent material, the sides being completed with canvas and capable of removal at will. The floors are raised a foot above ground. Size, 12 feet square. *Heating* is not provided. *Lighting* is by acetylene and oil lamps.

Staff : Medical director, four nurses, six maids, two gardeners.

Patients admitted in 1912 : 45.

Average stay : Four and a half months.

Bedfordshire.

In this county, poor law tuberculous cases are sent to the Infirmary at Bedford. There are a few beds for insured patients at the Bedfordshire County Hospital and the Bute Hospital at Luton. A county scheme is proposed for two dispensaries at Bedford and Luton, and two sanatoria near these towns, or alternatively a joint sanatorium near Sandy for Bedfordshire and Cambridgeshire.

THE DANESWOOD SANATORIUM,

Woburn Sands, belongs to the Trustees of the Jewish Convalescent Home, and owes its existence to the munificence of Mr. and Mrs. Bischoffsheim. It is situated in 3 acres of garden, surrounded by the Aspley Woods, which the Duke of Bedford has thrown open to the patients. *Soil* : Lower Greensand. *Altitude* : 400 feet.

Buildings : A previously existing house has been converted partly into administration, partly into wards, and a large addition made in the shape of a kitchen and of a three-story building with verandah on the south-east side, extending beyond the building and forming a rest-shelter.

The upper floors in both old and new parts consist of bedrooms each accommodating one or two patients, with a cubic space of 1700 feet. French windows. *Heating* by hot-water radiators. *Lighting* by electricity. Steam laundry and disinfectant.

Admission : By letter from a subscriber or Life Governor or some person in known position, with a report from the medical attendant.

Hon. Sec. : Miss R. Jacob, 16 St. John's Wood Park, London, N.W. When there is a vacancy, the patient is seen by the consulting physician. *Minimum stay* : Three months. Apply G. S. Joseph, Esq., 23 Clanricarde Gardens, London, S.W.

Financial : The cost of alterations and additions amounted to more than £25,000.

Treatment : Patients are given some outdoor work. There is an After-Care Committee in connexion with the Jewish Board of Guardians.

REFERENCE.—Bulstrode, *loc. cit.*, p. 265.

Hertfordshire.

THE NATIONAL CHILDREN'S HOME SANATORIUM,

Harpenden, midway between Luton and St. Albans, is situated on a ridge of the Chiltern Hills, 430 feet above sea level. *Soil* : Gravel over chalk. *Grounds* : Over 200 acres, of which ten have been specially reserved for the sanatorium. A branch of the National Children's Home and Orphanage, Bonner Road, London, N.E.

Buildings : A two-story building with central northern projection containing the kitchen department. The dining-hall occupies the centre of the south side, on the ground floor, and has a nurse's sitting-room on either side, beyond this a ward, beyond this again a nurse's bedroom. A day room for the boys occupies the western end; waiting-room and surgery the eastern end. The sanitary pavilions are north of the long corridor at the ends of the building. On the upper floor the arrangement is somewhat similar. There are six single-bedded rooms at the ends, larger wards in the more central portion. A large balcony serves this floor, a paved terrace the lower one. The maximum number in a ward is seven. *Heating* is by radiators in the dining-hall and corridors, elsewhere by open fire-places. *Lighting* by gas.

Staff : Visiting physician, sister in charge, six sisters, certificated teacher, etc.

Charges to public institutions or Boards of Guardians, 15s. to 20s. per week ; to Parents and Children's Aid Committees, 7s. 6d. ; free to those from the National Children's Home and Orphanage.

CHAPTER XXXVII.

LONDON AND MIDDLESEX.

London

is well supplied with Chest Hospitals and Poor Law Infirmaries, although these are often used to accommodate people who have come from outside the London area. Neither of these institutions are exclusively for cases of pulmonary tuberculosis, nor are they well adapted for true sanatorium treatment, owing to their situation in the Metropolis and to their limited grounds. In times past they have done invaluable service to the consumptives of small means. With the introduction of the Insurance Act their functions may have to be somewhat altered, although they are eminently well fitted for the observation and early treatment of cases of chest disease, until these are transferred to the country. Long-standing cases of consumption amongst the poor usually drift into the Poor Law Infirmaries. Many of these have exceedingly suitable quarters and arrangements in every respect but the two already mentioned.

For the insured, arrangements have been made to provide sanatorium accommodation for the London area in the Down Sanatorium, and in the Northern Fever Hospital, Winchmore Hill, both under the Metropolitan Asylums Board.

Many dispensaries have recently been opened in London for the treatment of tuberculosis, including a special department at St. Thomas's Hospital.

Cases of tuberculosis of bones and joints are received in the general hospitals.

Of the London Chest Hospitals the Mount Vernon Hospital is by far the most advantageously situated, being 300 feet above the sea level on Bagshot Sand, and from its position escaping many of

the London fogs. The Brompton Hospital is well known for the excellence of its arrangements. It is however low lying, in the river valley. The Victoria Park Chest Hospital, though surrounded by a dense population, is near a considerable open space.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Admitted.	Beds.
LONDON—					
† Rl. Hosp. Dis. Chest, City Road	1814	Sub. 1.	—	—	80
† Brompton Hosp. for Cons.	1841	Sub. 1.	—	—	373
„ Country branch	—	—	See Heatherside, Surrey	—	—
† City of London Hosp., Victoria Park	1848	Sub. 1.	—	—	170
† Mount Vernon Hosp., Hampstead	1860	Sub. 1.	—	—	120
Mount Vernon Hosp., Northwood	—	—	See Middlesex	—	—
Down San.	1913	—	See Surrey	—	—
† N. Hosp., Winchmore Hill	1913	—	Met. Asylum Board	E., w. M.A., m. M.A., w.	100 50 50
Home for Cons. Females, Paddington	1867	7/ ¹	—	—	26
St. Peter's Home, Kilburn	—	15/, 21/	—	A., w., c.	(80)
Friedenheim, Hampstead	1885	F., 42/, 84/	—	A.	(48)
St. Luke's House	1893	F.	—	A.	(36)
Free Home for the Dying, Clapham	1891	F.	—	A.	(36)
Alexandra Hosp. for Hip Disease	1867	4/2	—	S.	100

Middlesex.

There are two sanatoria in this county outside the London area, one of which is the country branch of the Mount Vernon Chest Hospital, while the other is a transformed fever hospital.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Admitted.	Beds.
Northwood Sanatorium	1904	30/	—	E.	112
† Clare Hall Hosp.	1913	—	South Mimms Jt. Hospital Bd.	E.	24
† Dagenham Hosp.	—	—	For West Ham	F. H.	—

¹ Entrance fee of 21/.

For signs and contractions, see p. 187.

THE NORTHWOOD HOSPITAL FOR CONSUMPTION,

Betchworth Heath, near the Hertfordshire border, is the outcome of a gift of £300,000 by Sir Henry Harben. *Grounds*: 104 acres, meadows, gardens, and 30 acres of pines and larches. *Soil*: Gravel and sand over chalk. *Altitude*: 370 feet.

The *building* is on a southerly slope and is of two stories. The central block faces south, and contains rooms for matron and resident medical officer, board-room, servants' bedrooms, and a large water-tank in the clock tower (fig. 9).

The wings run south-south-east and south-south-west; they consist of wards on the south side, a wide corridor with projecting sanitary pavilions to the north. Two terraces at different levels run in front of the building, and a wide balcony on the upper floor. There are ten wards with ten beds apiece, and twelve single-bedded rooms; in addition to which each wing has a consulting-room, an electric bath, and a winter garden at the end, and communicates with its own isolation block with independent arrangements for cooking and nursing. The ward windows are large casements to the floor level, with fanlights reaching to the ceiling. They have special blinds in lieu of verandahs. *Cubic space* per head is 140 cubic feet. The furniture is simple; walls are of washable distemper (in kitchens and sanitary blocks white tiles are used); *lighting* by electricity. The corridors have large windows to the north and pivoted windows into the wards near the ceiling. The sanitary pavilions are disconnected by a short well-ventilated lobby. Each contains eight bathrooms, special spray and douche room, lavatories, cloak and boot rooms, ward maids' and nurses' sinks, and patients' W.C.'s. Running north from the centre block is a corridor leading to the physician's house, the dining-room, nurses' room and kitchens. The place is heated by open fires and by Langfield's warm-air system. Electric lifts are provided.

Staff: Two resident medical officers, matron, sixteen nurses, and a visiting staff.

REFERENCES.—"Brit. Journ. of Tuberculosis," April, 1907 (view and plan). Bulstrode, *loc. cit.*, p. 423.

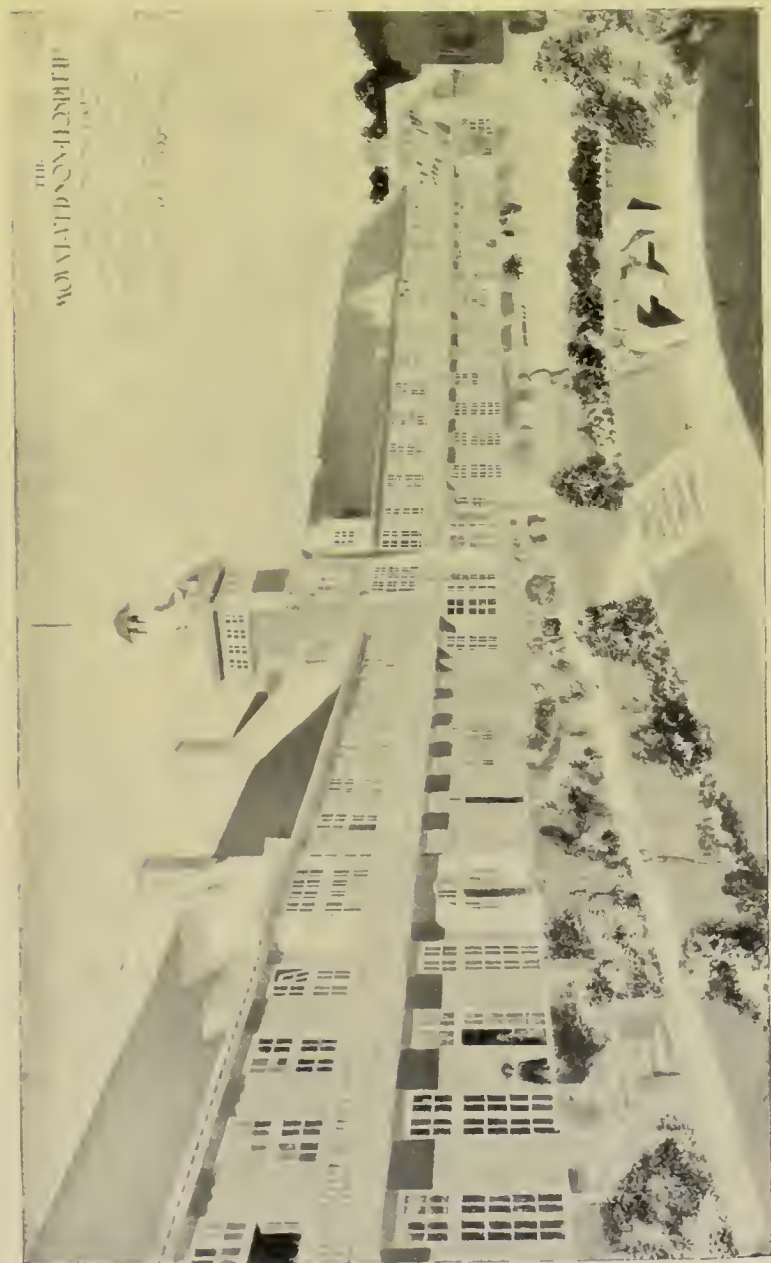


FIG. 9.—THE MOUNT VERNON HOSPITAL, NORTHWOOD [Face page 222



CHAPTER XXXVIII.

THE SOUTH-EASTERN COUNTIES.

COMPRISING Oxfordshire, Buckinghamshire, Berkshire, Hampshire, Isle of Wight, Channel Islands, Kent, Surrey, and Sussex.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Admitted.	Beds.
OXFORDSHIRE—					
† Kingwood San., Peppard	1899	4.5 gs.	Dr. Esther Carling	E., w.	12
† Maitland Cottage San., „	1901	32/6	„	E., m.	30
Kindercot „ „ „	1910	22/6	„	E., w.	23
Radcliffe Inf., Oxford	1770	—	—	E., c.	17
				—	(155)
BERKSHIRE—					
† Pinewood, Wokingham	1901	2, 2½, 3 gs.	Dr. Etlinger	E., m.	64
Boxgrove Cottage San., Tilehurst	1864	15/	(Dr. E. G. March)	E., w., c.	10
Royal Berkshire Hosp., Reading	1839	—	—	—	(167)
HAMPSHIRE—					
† Royal National San., Bournemouth	1855	7/6 and nom.	Dr. H. Holroyd	E., m.	47
Firs Home, „	1868	10/6	—	E., w.	42
† Hahneemann Conv. Hosp., Bournemouth	1879	21/ or 7/6 and l.	(Drs. Hardy and Ord)	A.	20
St. Joseph's Hosp., „	1888	6/, 8/, 12/	(Dr. G. A. Reid)	E.	32
† Home San., „	1898	3.5 gs.	Dr. Esslemont	A.	72
				E., m.	23
				E., w.	20
† Boro San., Shirley	—	—	For Southampton	—	—
† Longstone Hosp.	—	—	For Portsmouth	F. H.	—
Linford, Ringwood	1899	4.5 gs.	Drs. Felkin, Snowden and H. A. F. Wilson	E.	37
Moorcote, Eversley	1899	2½-5 gs.	Dr. J. G. Garson	E.	15
Treloar's Home, Alton	1907	6/	Dr. Gauvain	S., c.	—
Dr. Johns San., West Howe	—	—	See Dorsetshire	—	—
ISLE OF WIGHT—					
Royal National Hosp. for Cons., Ventnor	1869	10/ and l.	—	E., m.	103
St. Catherine's Home, „	1879	10/6	(Dr. Bassano)	E., w.	60
				A.	12
KENT—					
† Benenden San.	1907	25/, 30/ and 35/	Dr. E. M. Mayberry	E., m.	118
† [Keycol Hill Hosp., Bobbing]	—	—	Milton and Sittingbourne Jt. Hosp. Bd.	F.H.,m.	17
† Cranbrook Conv. Hosp.	1896	—	For Metr. Hosp.	M.,w.,c.	18

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
<i>KENT continued—</i>					
[Bromley and Beckenham Hosp.]	—	—	—	F. H., m.	20
Rl. Seabath'g H., Margate	1791	8/, 12/, 30/	—	c.	8
" " " "	—	—	—	S., m.	(36)
" " " "	—	—	—	S., w.	(36)
" " " "	—	—	—	S., c.	(88)
Vine Hosp., Sevenoaks	1872	5/	For hip disease	S., c.	38
St. Catherine's Hosp., Ramsgate	—	—	—	S., c.	—
Victoria Home, Margate	1892	5/	—	S., c.	(47)
Metr. Asyl. Bd. Home, „	1898	—	—	S., c.	(130)
Conv. Home and Sch. Holy Farm, Margate	1879	8/	—	S., c.	(150)
<i>SURREY—</i>					
† Whitmead San., Tilford	1899	63/	Dr. Hurd Wood	E.	20
† Crooksbury San., Farnham	1900	35/, 42/, 63/	Dr. G. Fleming	E.	41
† Woodhurst San., Dorking	1902	30/, 21/	Dr. Mary McDougall	E., w., c.	20
† Ockley San., Ockley	1903	35/, 42/, 2½ gs.	Dr. Clara Hind	E., M.	20
† Heatherside, Frimley	1904	30/	Dr. W. O. Meek	E., m.	104
				E., w.	42
				E., c.	4
† Down San., Sutton	1913	—	For London	E., m.	300
Queen Mary's Hosp., Carshalton	1909	—	—	S., c.	1000
Barnes Isol. Hosp.	1913	—	—	All	(12)
Croydon General Hosp.	1867	—	—	S.	(100)
Royal Surrey County Hosp., Guildford	1866	—	—	S.	(100)
Reigate and Redhill H.	1866	—	—	S.	(40)
Richmond Royal Hosp.	1868	—	—	S.	(72)
St. Peter's Mem. Home, Woking	1885	—	—	S.	(80)
<i>SUSSEX—</i>					
† Eversfield Hosp., St. Leonards	1884	13/ to 17/ 42/, 63/	—	—	55
Rudgwick San.	1898	2-2½ gs.	Dr. Annie McCall	E.	10
† Fairlight Conv. Hosp., Ore	1899	—	—	m.	50
† Brighton Boro' San.	—	—	—	—	48
Brighton Isol. Hosp.	—	—	—	F. H.	(156)
Sussex County Hosp., Brighton	1828	—	—	S.	(196)
West Sussex, E. Hants Inf., Chichester	1827	—	—	S.	(70)
Pr. Alice Mem. Hosp., Eastbourne	1883	—	—	S.	(50)
St. Leonards and E. Sussex Hosp.	1840	—	—	S.	(84)
† King Edward VII San., Midhurst	1906	—	Dr. Bardswell	E., m.	52
† Lewes San.	—	—	—	E., w.	51
				—	—

For signs and contractions, see p. 187.

Oxfordshire.

There is a voluntary anti-tuberculosis association in this county with branch dispensaries in all the larger towns.

KINGWOOD SANATORIUM,

Peppard Common, is placed in a cherry orchard attached to a farm on the Chiltern Hills, six miles from Reading. *Grounds* : 8 acres, partly garden and meadow, partly woodland. *Soil* : Gravel and sand over chalk. *Altitude* : 380 feet.

Buildings : An ordinary house modified for the purpose, a well-constructed wooden dining-room, medical director's chalet, and shelters.

The rooms have very large windows, and suitable furniture and decorations. *Heating* by hot-water pipes. *Lighting* by acetylene gas.

Staff : Medical director, matron, two nurses, masseuse and four servants.

Patients are admitted for rest cures and Weir-Mitchell treatment.

MAITLAND SANATORIUM,

Peppard Common, is situated on a farm adjoining the Kingwood Sanatorium, on the Chiltern Hills. The surrounding country consists of farms, open commons and woodland. *Station* : Reading, six miles. *Grounds* : 52 acres. *Soil* : Gravel over chalk. *Altitude* : 380 feet.

Buildings : Consist of a main structure, with separate quarters for the men and women respectively, a children's department (Kinder-cot), farm buildings and laundry. The old building, occupied by women patients, is a wooden structure of one story, with verandah on the south side. A newer building, of hollow tiles, has the men's quarters below and staff quarters above. Single-bedded rooms are few, and are only used for new arrivals and for special cases. Maximum number of beds in a ward, six. *Heating* is by open fires and steam radiators. *Lighting* by acetylene gas and petrol-air gas. There are numerous wooden shelters. A power-laundry has been built in hollow brick.

Kindercot,

or the children's department, is a substantial brick building of two stories, containing a large day room, and wards for seventeen children.

Staff: The resident medical officer, honorary secretary, two matrons, five nurses, two teachers, five maidservants, two men porters, one male nurse, eight mechanics and gardeners.

Financial: Cost of erection, with land, £9300, of which the land cost £2600. Cost of maintenance: for adults 9s. 1d., for children 5s. 2d. Beds can be reserved for £50 in Kindercot.

Admissions: Beds are reserved by the Boroughs of Bermondsey, Kensington, Reading, Stepney, Westminster, and Woolwich. The Charity Organization Society has sent many patients. The conversion of the sanatorium into an approved institution under the Insurance Act is under consideration by the Local Government Board and Board of Education. Children are admitted now between the ages of six and twelve.

Patients admitted in 1912: 284, of which thirty-three were children.

Average stay for adults eight weeks, children twelve weeks.

Employment is often given to ex-patients in the sanatorium. There were ten such working patients during 1912.

REFERENCE.—Bulstrode, *loc. cit.*, p. 456.

Berkshire.

There is an open-air school in this county for thirty delicate children. Sanatorium arrangements are under consideration.

THE PINWOOD SANATORIUM,

Nine Mile Ride, Wokingham, is situated in undulating country consisting largely of pine woods and heather land. Originally founded through the generosity of Messrs. Wernher, Beit & Co., it was presented by them on 1 April, 1912, to the Institute of Bankers, London.

It is protected by trees to the north and east. *Grounds:* 82 acres, partly woodland, partly gardens. *Soil:* Bagshot sands. *Altitude:* 200 feet. *Stations:* Wellington College, two miles; Bracknell, four miles; Wokingham, nearly four miles.



FIG. 10.—PINEWOOD SANATORIUM

Buildings: Consist of a central administrative two-story block with wings for the patients, a dining-room block with kitchen behind, steam laundry, stables, engine-house and isolation block (fig. 10). The central block has rooms for the medical officers and matron, with a verandah on the south side, entrance hall, etc., to the north. Connected with this by covered corridors, and forming with it a concavity to the south, are the pavilions with patients' rooms. The bedrooms are light and airy; they have large windows of casements with fanlight above; curtains with pole fixed a foot inside the room, smooth washable walls with well-rounded angles, simple furniture, electric lighting, and heating by steam pipes and if necessary open fires. There is no fanlight over the door. Rooms all single-bedded. Cubic space, 1200 cubic feet. Behind the rooms are well-lighted, airy corridors and beyond them baths, douche-room and W.C.'s. At the end of each pavilion is a two-story rest-shelter (fig. 11); behind this, a northerly verandah. The staircases are made without risers, the dust falling through to the ground underneath. The dining-hall is to the north, opposite the entrance. Three of its sides are open to the air, and provided with large French windows and doors. The fourth leads to the kitchen department. *Heating* by steam pipes, and if necessary, open fires. *Lighting* by electricity: duplicated plant.

Financial: Original cost, £40,000. Supported partly by fees of patients, partly by a guarantee fund subscribed by the leading bankers and merchants of London. *Terms*: Two guineas for salaried clerks employed by the guarantors, two and a half guineas for any near relative, three guineas for other approved cases.

Staff: Two medical officers, sister in charge and nurses.

Admissions: Apply to the Secretary, 34 Clement's Lane, London, E.C.

REFERENCE.—Bulstrode, *loc. cit.*, p. 274.

Hampshire and the Isle of Wight.

THE ROYAL NATIONAL SANATORIUM

for consumption and diseases of the chest, Bournemouth, is situated on a sheltered hillside close to the Mont Dore, the grounds of the two institutions touching one another. It is about half a mile from

the coast. *Grounds*: 3 acres of garden, with a fine lawn, beyond which the ground falls to the bottom of the valley. *Soil*: Bagshot sands. *Altitude*: 120 feet.

Buildings: A two-story one with a large chapel at the east end. Corridors run from end to end, the patients' rooms being to the south, as well as a large dining saloon and a day room on each floor. Wards mostly for three or five beds apiece; some single-bedded. Staff-rooms, lavatories, bath-rooms and W.C.'s in a projecting pavilion on the north side. Kitchen and administrative portions are also to the north. *Heating* by open fires and hot-water pipes. *Lighting* by electricity. A few large shelters have been erected in the grounds.

Closed in July and August, owing to the heat.

Staff: Three visiting physicians, surgeon and dentist, resident medical officer, matron and eleven nurses.

Patients admitted in 1912: 396.

Average stay, sixty-four days.

Financial: Supported by voluntary contributions mainly. Cost of maintenance per head per week: £1 os. 6d., of which food costs 8s. 8½d.

REFERENCE.—Bulstrode, *loc. cit.*, p. 384.

THE HOME SANATORIUM,

Southbourne Road, Bournemouth, is in one of the suburbs of that town, within 600 yards of the sea. *Grounds*: 10 acres, well wooded, overlooking the valley of the Stour to the east. *Soil*: Bagshot sands. *Altitude*: 150 feet. *Stations*: Boscombe, one and a half miles; Bournemouth Central, two and a half miles.

Buildings: A fine modern three-story erection has been added on to an older portion at right angles. In the former the rooms are in single row, served by a corridor to the north-east, and provided with balconies on the south-west side. There are a number of large common rooms, and a large glazed winter garden. *Heating* by open fires or anthracite stoves and (in some rooms) by hot-water radiators. *Lighting* by electricity. Electric lift. Internal decorations are in high-class sanatorium style. All the rooms but two are single-bedded; these two are extra large and allow of a second bed if

desired. There are a number of chalets in the grounds with windows on all sides.

THE ROYAL NATIONAL HOSPITAL FOR CONSUMPTION

and diseases of the chest, was founded by the late Dr. Hassall. It is *situated* on the Undercliff to the west of Ventnor; 300 yards from the sea. *Grounds*: 22 acres. *Soil*: Lower Greensand. *Altitude*: 80 feet.

Buildings: Eleven blocks, with a chapel in the centre, all connected by a subway. Each block is of three or four stories, of brick and stone, with all the rooms to the south, and a separate entrance to the north, a covered verandah along the ground floor, and covered balconies to all but the topmost floors above. All bedrooms are single-bedded; staircases, and quarters for nurses and servants are to the north. There are common rooms on the ground floor of each building. One of the central blocks has the administration rooms; connected with it on the north side are the kitchen quarters, and on the south side a large dining-hall with a stage at one end for entertainments. This and the chapel are used by both sexes in common. The internal fittings and decorations are those of a modern hospital. *Heating* by steam pipes. *Lighting* by electricity. No passenger lifts. Shelters in the grounds.

Staff: Three visiting and three resident medical officers, general superintendent, matron and twenty-two nurses.

Patients admitted in 1912: 675. *Average stay*: eighty-seven days.

Financial: Cost of erection of buildings, over £100,000. Cost of maintenance: £1 os. 1d. per head per week, of which food costs 11s. 8d. Maintained by private subscriptions. Average total cost of each patient is £20 6s. 10d. per annum.

Admissions: Apply to the Secretary, 34 Craven Street, London, W.C. Insured patients as such are not admitted.

REFERENCE.—Bulstrode, *loc. cit.*, p. 388.

LINFORD SANATORIUM,

Ringwood, is *situated* in the open country, surrounded on all sides by heather land, within a stone's-throw of 1500 acres of woodland, chiefly pines and oaks, forming part of the New Forest. The sana-

torium was founded by Dr. R. Mander Smyth, at one time assistant to Dr. Walther. *Grounds* : 36 acres, two being garden and meadow. *Soil* : Gravel and clay overlying Bagshot sands at a depth of about 12 feet.

Buildings : Three portions, of which one is a farm, another (the old refectory or Lin Gardens) on low-lying ground, the third or main building being on top of a steep hill on the other side of the main road. The latter is a two-story brick building with patients' rooms to the south. These have large windows, panelled walls, polished maple floors, a douche, a fixed washbasin with hot and cold water laid on, and suitable furniture. All the rooms are single-bedded. *Heating* by hot-water radiators. *Lighting* by electricity. *Cubic space* : 1766 cubic feet. Rooms at the farm and at Lin Gardens a little smaller, and without the douche, but served by common bathrooms. The dining-room and kitchen quarters used to be in Lin Gardens, but have been replaced by new ones behind the main building in a separate block (fig. 12).

MOORCOTE,

Eversley, Winchfield, is in a district richly wooded with pine-trees. *Grounds* : $7\frac{1}{2}$ acres. *Soil* : Gravel overlying sandy Tertiaries. *Altitude* : 295 feet. *Stations* : Winchfield, Wellington College.

Buildings : Two ordinary two-story houses with large hall, and shelters in the grounds. One of the houses (Glencote) receives non-tuberculous patients.

Staff : Resident physician, lady superintendent and two nurses.

LORD MAYOR TRELOAR'S CRIPPLES' HOME AND COLLEGE,

Alton, is almost unique of its kind. Crippled boys are treated surgically and taught various trades. *Apply to* Sir W. Treloar, 61 Moorgate St., London, E.C.

REFERENCE.—"Brit. Journ. of Tuberculosis," Jan., 1910.

Kent.

Dispensaries have been established at Beckenham, Gravesend, Sheerness, and Sittingbourne.



FIG. 12.—LINFORD SANATORIUM



THE ROYAL SEA-BATHING HOSPITAL,

Margate, is probably the oldest institution in England for the treatment of surgical tuberculosis. It is *situated* on the coast, in about 5 acres of ground, 20 feet above the sea level. *Soil*: Chalk.

Buildings: Form a hollow square, with projections at the corners, and from the centre of one side. There are no single-bedded rooms. Maximum number in a ward, eighteen. Eight beds (four boys, four girls) are reserved for pulmonary tuberculosis in an early stage. For surgical tuberculosis there are thirty-six each for men and women, forty-six for boys, thirty for girls; for isolation, twelve beds. *Heating* is by hot water and open grates. *Lighting* by gas, excepting in the theatre and electro-therapeutic department, where electric light is laid on.

The hospital has its own supply of sea-water for bathing.

Staff: Three honorary visiting and one honorary assistant visiting surgeon, honorary dental surgeon, two resident medical officers, etc.

Admissions: Secretary, 13 Charing Cross, London, S.W.

Patients admitted in 1912: 462. *Average stay*: 129 days.

Financial: Supported by voluntary contributions. Total cost of maintenance per head, £62 18s. 10d. per annum. Children admitted at 8s. per week; older patients at 12s., with letter of recommendation; without, 30s. per week.

REFERENCE.—Bulstrode, *loc. cit.*, p. 405.

THE NATIONAL SANATORIUM, BENENDEN,

belongs to the National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis, and was erected largely with the help of subscriptions from the working classes.

It is *situated* in the Weald of Kent, seven miles south of Headcorn and sixteen miles north of Hastings. *Grounds*: 252 acres, mainly farm land and pasture, varying in elevation from 200 to 250 feet. *Soil*: Tunbridge Wells sand overlying Wadhurst clay. *Altitude*: 220 feet.

Buildings: Consist of a central block, an administrative block with dining-hall and kitchen department, a laundry and lighting block, two separate pavilions for twenty patients, and a large tent

for ten patients. All but the latter are built of *frazzi* (a kind of terra-cotta) in hollow slabs built up on a steel framework and cemented inside and out. The main building is of two stories, and has two wings placed at a very open angle. In the centre is a lobby and a large recreation hall, opening to the south on to a verandah. Each wing consists of two portions divided by a staircase, the inner portion being provided with a corridor on each floor on the north side, while there is no corridor on the outer or distal portion. The inner portion has twenty single-bedded rooms, the outer has twenty-four cubicles, each with two beds. There are large casement windows with hinged fanlights on the south side, opening on to a terrace below, a balcony above; similar windows on the north side and at the ends, and ventilators beneath each bed. Teak doors and floors. *Cubic space*: 720 feet in the cubicles, 1200 feet in the single-bedded rooms. Behind the centre of each wing is a lavatory annexe with boot-room, isolated by a cross-ventilated corridor. On each floor there is also a small ward kitchen and a cloak-room. A covered passage runs north to the administration block. This forms a hollow square with the kitchen department, and includes quarters for medical officer, nurses and maids. Attached to its west side is the dining-hall. The kitchen is of one story, with top lights. *Heating* in the lavatories is by steam, in the wards by anthracite stoves. *Lighting* is by petrol gas in the main building, by acetylene in the pavilions. One of these is for Post Office employees.

Financial: The total cost is estimated to be £20,000 for 200 beds. Cost of maintenance, 25s. per week.

Staff: A medical superintendent, assistant medical officer, matron, secretary, steward, nurses and servants. Administration by a House Committee.

Statistics: Patients admitted in 1912: 321. *Average stay*: 111 days.

For admission apply to the Secretary, 54 Gray's Inn Road, London, W.C.

REFERENCE.—Bulstrode, *loc. cit.*, p. 394.

Surrey.

There is a tuberculosis dispensary at Barnes, and others are projected in all the chief towns. A few beds have been opened in





FIG. 13.—CROOKSBURY SANATORIUM—SOUTH BLOCK



FIG. 14.—CROOKSBURY SANATORIUM—NORTH BLOCK

[Face page 233]

connexion with the Barnes institution. Insured patients are sent to the Crooksbury Sanatorium, Brompton Hospital and Frimley Sanatorium, the Barnes Hospital, and some institutions outside the county.

CROOKSBURY SANATORIUM

is *situated* near Crooksbury Hill between Godalming, Farnham and Haslemere, about equally distant from London and the English Channel. The district is beautiful, abounding in pine-clad hills and stretches of heather; the climate relatively dry and bracing. The sanatorium is placed on the south side of a range of low hills, with the Hog's Back (chalk downs) and heights above Aldershot to the north, the valley of the Wey and Hindhead to the south. *Stations* : Farnham, three and a half miles; Tongham, two and a half miles; Ash (S.E.R.), four miles. Nearest town, Farnham. *Soil* : Very porous (Lower Greensand). *Altitude* : 420 feet. *Grounds* : 25 acres, thickly wooded to the north.

Buildings : Two, solidly built with rough-cast brick walls and red-tiled roofs, subsidiary buildings and chalets of wood for from one to six patients each. The original (south) block has twelve rooms opening on to a terrace and lawns, and served by a corridor, behind which is a central northern projection consisting of dining-hall and kitchen department. Above the latter are quarters for women servants. The patients' rooms are all single-bedded, and are finished internally with sirapite and duresco, angles rounded, tiled corner washstands, corner cupboards with mirror doors, and other special furniture. The north block is of two stories, with a large shelter to one side and a balcony above the porch. Internal decoration similar to that of the other block. *Cubic space* : 1200 cubic feet. *Heating* by hot-water pipes in the buildings, open fires in the bungalows and chalets; some of the latter have no heating apparatus. *Lighting* throughout by electricity. Earth-closets. Water supply from the Wey Valley Water Company (figs. 13, 14).

Staff : Resident physician, two nurses, housekeeper, seven maids, four men and boys, with a secretary and a lady superintendent.

Financial : Cost about £12,000, including land, road-making, buildings, water supply, electric installation, furniture, etc. Built by a private company consisting chiefly of Dr. F. R. Walters and his friends.

WHITMEAD SANATORIUM

is *situated* between Godalming, Farnham and Haslemere, overlooking the Wey Valley and the Tilford Downs and Hindhead. To the east is a well-wooded slope, and between it and the house, a shallow valley belonging to the estate. Crooksbury Hill lies to the north-west. *Grounds*: Ten acres, part garden, part woodland with beech and pine trees, or heather land. *Soil*: Lower Greensand. *Altitude*: 300 feet. *Station*: Farnham, three and a half miles.

Buildings: Originally a private house, a wing has been added at the western end, with a deep, glass verandah in front of it and a narrow balcony for the upper floor. Behind these are twelve bedrooms in single row, with corridor to the north; the upper floor being reserved for ladies. The floors are covered with linoleum; the walls distempered. Each bedroom has half-glazed French windows with fanlights over. *Cubic space*: 960 cubic feet. There is a bathroom on each floor, and a staircase at the eastern end which connects the new with the older part.

The original building is a picturesque house with several gables, having the entrance porch behind and a low verandah in the centre of the south side. At the eastern end there is an additional story; a few beds for patients are in this part of the building, and on the ground floor the dining-room and drawing-room, consulting-room and kitchen department. This portion is comfortably furnished, but has no special advantages for open-air treatment. The whole place is *lit with* electricity; *heating* is by hot-water pipes in the corridors, and open fires in the bedrooms; these are only allowed under the direction of the doctor, and are charged extra. There are fine views from many of the rooms and from the terrace over Hindhead, the Surrey and the Hampshire hills.

Staff: Medical director, trained nurse, and servants.

WOODHURST SANATORIUM,

Tower Hill, Dorking, is *situated* close to Glory Woods (40 acres), to which patients have access. *Grounds*: $1\frac{1}{2}$ acres. *Soil*: Sand and gravel over chalk. *Altitude*: 320 feet.

Buildings: An ordinary dwelling-house of three stories. Three single-bedded rooms; maximum number in a ward, four. *Heating* by open fires. *Lighting* by electricity.

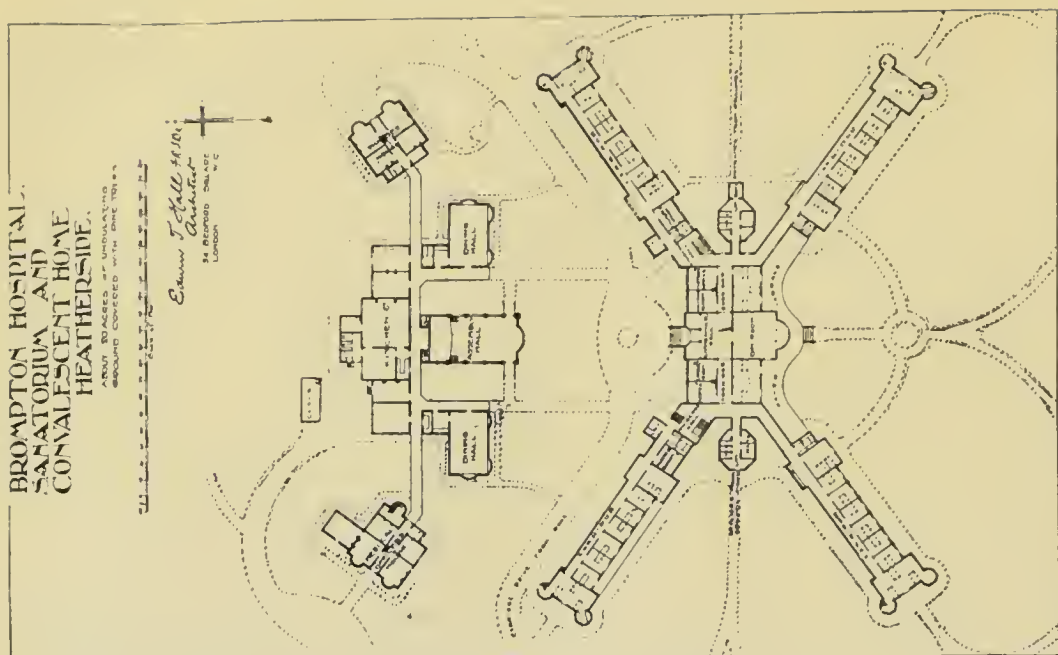


FIG. 15.—HEATHERSIDE—GROUND PLAN



FIG. 16.—HEATHERSIDE

[Face page 235

Staff: A visiting physician, matron, secretary and two nurses.

Patients admitted in 1912: 31. *Average stay*: Six months.

Terms for children under twelve years, 21s.

OCKLEY SANATORIUM

is *situated* in the country near Leith Hill, seven miles from Horsham, and an equal distance from Dorking, protected on the north by the chalk downs, with a fine view to the south. *Grounds*: 2 acres. *Soil*: Wealden clay. *Altitude*: 300 feet.

Buildings: A brick building with rooms for ten patients, and chalets for an equal number, mostly for two apiece, others single-bedded. Ventilation is by open windows. *Heating* by open fireplaces in the building; none in the chalets. *Lighting* by oil lamps. There is a large dining-hall and recreation-room.

Staff: Resident physician, two nurses, four maids and a gardener.

Financial: Original cost of house and grounds, £1250; of alterations and additions and furnishing, £4500. Private patients pay two and a half guineas; the insured 35s. to 42s.

HEATHERSIDE,

Camberley, is the sanatorium and convalescent home for the Brompton Hospital for Consumption. It stands on an elevated plateau on the Chobham Ridges, surrounded on three sides by pine woods, but enjoying an extensive view on the south side over Frimley Common, Farnborough and Aldershot, the Hog's Back and Crooksbury Ridges. *Grounds*: 20 acres. *Soil*: Upper Bagshot sands. *Altitude*: 400 feet. *Stations*: Frimley, three miles; Farnborough, four miles.

Buildings: Consist of three portions, the main building, the administration building, and the engine-house. The main building (figs. 15, 16) has a central oblong portion of three stories, with two-story pavilions radiating from each corner, together forming an X. The central part has a day room and two three-bedded wards on each upper floor, and behind these the entrance-hall, dispensary, consulting-room, waiting-room and matron's room. In the angle between the two are sanitary pavilions, accessible from the grounds, and quite isolated. Each radiating pavilion consists of a three-bedded

ward, a two-bedded ward, and six single-bedded rooms on each floor; also a linen-room and a nurses' room. The northern pavilions have each a main staircase; safety staircases in turrets are placed at the end of every pavilion. In the wards the windows open down to the ground level, with fanlights and glazed roller blinds. Fanlights also over the doors. *Cubic space*: over 1300 feet. Internal details those of a high-class sanatorium.

The administration block comprises an assembly hall and two dining-halls attached to the kitchen department, leading by covered corridors to the nurses' house and medical officer's house. In the dining-rooms and recreation-hall are large multiple windows opening like louver shutters. *Heating* is by hot-water pipes. *Lighting* by electricity.

Financial: Cost of erection, £70,000. Cost of maintenance per head, £68, of which food costs £31.

Staff: Forty-four persons, under the medical superintendent. Also a visiting staff.

Admissions in 1912: 491. *Average stay*: Fourteen weeks. Patients are selected from those in the Brompton Hospital.

REFERENCES.—"Lancet," 21 Nov., 1908; Bulstrode, *loc. cit.*, p. 465.

THE DOWN SANATORIUM.

This was originally an isolation hospital, but is being transformed by the Metropolitan Asylum Board to serve as a sanatorium for male insured patients. It is situated between Carshalton and Sutton on the Epsom line, L.B. & S.C.R.

Sussex.

KING EDWARD VII SANATORIUM,

Midhurst, is the outcome of a gift of £200,000 from Sir Ernest Cassel to the late King in commemoration of his coronation. Originally part of the Cowdray estate, it is four miles from Midhurst Station, six from Haslemere Station. The sanatorium is placed on a natural plateau from which the ground slopes rapidly to the south, giving extensive views over the South Downs and intermediate country. *Grounds*: 151 acres. *Soil*: Lower Greensand. *Altitude*: 495 feet.

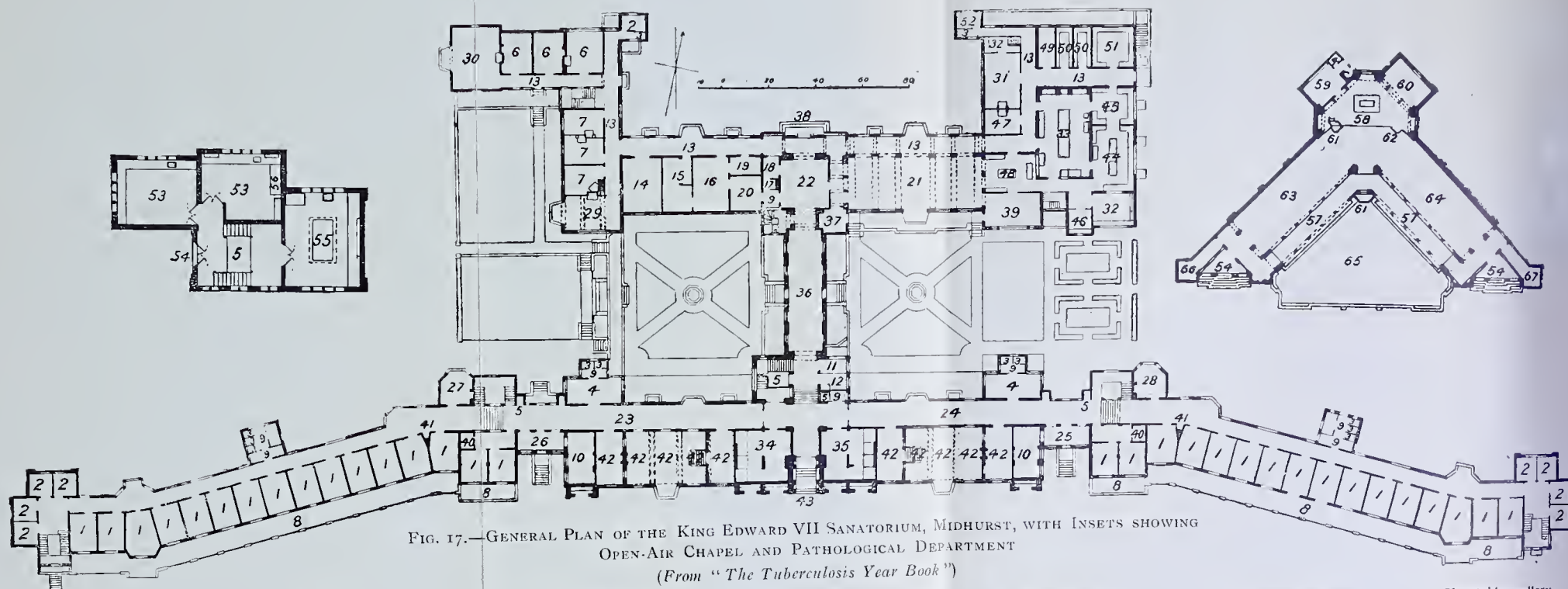


FIG. 17.—GENERAL PLAN OF THE KING EDWARD VII SANATORIUM, MIDHURST, WITH INSETS SHOWING
OPEN-AIR CHAPEL AND PATHOLOGICAL DEPARTMENT
(From "The Tuberculosis Year Book")

1. Bedrooms
2. Bathrooms
3. W.C.'s
4. Lavatories
5. Lifts
6. Medical officers' bedrooms
7. Medical officers' sitting-rooms

8. Balconies
9. W.C. lobbies
10. Cloakrooms
11. Cloakroom (well-to-do male)
12. Cloakroom (well-to-do female)
13. Corridors
14. Operative theatre
15. Dispensary

16. Consulting-room
17. Telephone
18. Porter
19. Dark room
20. Waiting-room
21. Dining-hall
22. Entrance hall
23. Male necessitous corridor

24. Female necessitous corridor
25. Female necessitous patients' entrance
26. Male necessitous patients' entrance
27. Nurses' room
28. Nurses' sitting-room
29. Committee-room

30. Medical library
31. Servants' hall
32. Pantries
33. Kitchen
34. Male hydropathic room
35. Female hydropathic room
36. Connecting corridor
37. Small dining-room

38. Principal entrance
39. Dining-room
40. Linen
41. Hydrants
42. Recreation rooms
43. Well-to-do patients' entrance
44. Scullery

45. Vegetable scullery
46. Nurses' pantry
47. Nursekeeper's room
48. Servery
49. Cook's room
50. Larders
51. Storeroom
52. Pails and brooms

Clinical Research Block (53 to 56)

53. Research laboratory
54. Entrance
55. Research laboratory (post-mortem under)
56. Stink cupboard

57. Open cloister
58. Altar
59. Vestry
60. Organ space

61. Pulpit
62. Lectern

Chapel (57 to 67)

63. Nave for men
64. Nave for women

65. Courtyard
66. Storeroom

67. Mortuary chapel

The building is roughly T shaped, and consists of an administrative portion to the north, united by a double corridor with the patients' quarters. The former has the main entrance to the north, with near it on the west side the waiting, consulting, operation, X-ray and dark rooms, the committee-room, dispensary, laboratories, medical library and medical officers' sitting-room. Over this are the medical officers' quarters; and under them the porter's room. To the east of the entrance is the dining-room communicating with the kitchen department. On the first floor of the central portion facing south are the rooms for matron, and nurses' sitting-room, from which the patients' quarters can be quickly reached through the upper corridor. Above are the bedrooms for nurses and servants in separate parts (fig. 17).

The patients' portion is divided into three distinct blocks connected by corridors on each floor. On the ground floor of the centre block are recreation-rooms and cloak-rooms for each sex, and the hydro-therapeutical department. On the first floor are twelve wards, and two spare rooms for special cases; also two sitting-rooms. All these have a balcony facing south, separated the one from the other by canvas screens. The bedrooms are 14 feet \times 11 feet 6 \times 11 feet (1750 cub. ft.) on the lower floor, 13 feet 6 \times 11 feet 6 \times 11 feet (1700 cub. ft.) on the upper. There is a bathroom for every three patients, and an attendants' room. There is separate access to the grounds for the occupants of the special rooms, as well as to the douche-rooms, consulting-rooms, dining-hall and main entrance. On the top floor of the central block are wards for twenty-two bed-patients, also with a balcony. These can easily be served from the kitchen, and are near the medical officers' and nurses' quarters and the passenger lift. The rooms on the upper floor are recessed so that their balconies do not project beyond the front of the rooms below, to avoid interference with the entrance of sunlight. The side wings form an obtuse angle with the central portion of the building. On the ground floor on each side is a corridor for walking exercise in rainy weather; also sixteen bedrooms with a wide terrace in front, and nurses' rooms, linen rooms, bathrooms, etc., behind. At the ends are emergency staircases which lead to the rest galleries. In the basement on the men's side

are workshops. A clock-tower surmounts the centre of the building.

The furniture and internal decorations resemble those of the more expensive private sanatoria. There are louvre shutters to the large casement windows, fanlights over the doors. *Heating* by open fires and hot-water pipes. *Lighting* by electricity.

The pathological department, laundry with engine-house, motor-shed, medical superintendent's house, and chapel form detached buildings. The chapel was the gift of Sir John Brickwood, and is of unusual design, consisting of two naves meeting an octagonal chapel at an angle, each nave having an open-arched south front.

Staff: Three medical officers, a pathologist, steward, matron, etc., with a consulting and visiting staff.

Financial: The buildings alone cost over £60,000; the chapel £20,000.

Admissions: Ladies and gentlemen of small means in an early stage of disease. Apply to the medical superintendent at the sanatorium.

Cases admitted in year ending 30 June, 1912: 273.

REFERENCES.—

"Tuberculosis" (London), iv. 2, August, 1906.

"Brit. Med. Journal," 16 June, 1906.

"Lancet," *ibid.*

Bulstrode, *loc. cit.*, p. 476.

EVERSFIELD HOSPITAL,

St. Leonards-on-Sea, is a good-looking building with covered and uncovered balconies on the south side, large windows, and wards occupying mostly the south and west sides. There is a large dining-hall on the ground floor, with a nurses' day-room under it and large wards on the two floors above it. Lavatories, baths, etc., occupy the north-eastern angle, and the remainder of the space north of the corridor is occupied by staff-rooms, sitting-rooms and small wards. There are forty-nine beds in the large wards, eight in private wards. *Terms*: 13s. with letter of recommendation, 17s. without; in the private wards two to three guineas.

REFERENCE.—Bulstrode, *loc. cit.*, p. 474.

CHAPTER XXXIX.

THE SOUTH-WESTERN COUNTIES.

INCLUDING Cornwall, Devon, Somerset, Dorset, Wilts, Gloucester, and Hereford.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
DEVONSHIRE—					
Western Hosp. for Incip. Cons., Torquay	1850	12/6, 7/	—	E.	40
Mildmay Cons. Home, „	1886	10/6, 7/	—	A.	10
St. Barnabas' Home for Incip. Cons., Torquay	1892	10/	Dr. W. W. Stabb	A.	30
† Dartmoor San., Chagford	—	3-5 gs.	Dr. C. H. Berry	E.	21
† Udal Torre San., Yelver- ton	—	—	Belongs to Welsh National Assoc.	E.	23
† Devon and Cornwall San., Didworthy	1903	25/	Dr. Livermore	E.	61
County San., Hawkmoor, in con. Bovey Tracey	—	—	Dr. J. Penn Milton	E.	100
† Tiverton Isol. Hosp. Pav.	„	—	—	A.	20
Newton Abbot „	„	—	—	A.	20
Bideford „	„	—	—	A.	20
Plymouth „	—	—	—	A.	—
N. Devon Inf., Barnstaple	1826	—	—	S.	(60)
Rl. Albert Hosp., Devon- port	1863	—	—	S.	(65)
Rl. Devon and Exeter H.	1741	—	—	—	(200)
S. Devon and E. Corn- wall Hosp., Plymouth	1840	—	—	—	(155)
Torbay Hosp.	1844	—	—	—	(65)
CORNWALL—					
W. Cornwall Miners' Hosp., Redruth	1863	—	—	—	(54)
Rl. Cornwall Inf., Truro	1799	—	—	—	(52)
DORSETSHIRE—					
Dr. Johns San., West Howe	—	4 gs.	Dr. Johns	E.	10
Dorset Co. Hosp., Dor- chester	1841	—	—	—	(50)
SOMERSET—					
Nordrach upon Mendip	1899	3-5 gs.	Dr. Thurnam, Dr. Wheeler	E.	38
† Mendip Hills San.	1900	2½-3½ gs.	Dr. Muthu	E.	24

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Patients Ad- mitted.	Beds.
SOMERSET cont.—					
† Engel Home, Cheddar	—	16/, 3/6, 30/	(Sisters of St. Peter)	E., w.	17
St. Michael's Home,	1878	F.	„	A., m.	20
Axbridge	—	—	—	A., w.	16
Bath Union Inf. Pav.	—	F.	—	P. L., m.	10
Frome Union Inf.	—	F.	—	P. L., w.	10
Axbridge Union Inf. Pav.	—	F.	—	P. L.	—
Ham Green Isol. Hosp.	—	—	For Bristol	P. L.	—
Rl. United Hosp., Bath	1826	—	—	F. H.	21
Bridgwater Hosp.	1813	—	—	—	(130)
Lansdowne Hosp., Bath	1890	—	—	—	(42)
Taunton and Somerset H.	1809	—	—	—	(50)
Weston-s.-Mare Hosp.	1865	—	—	—	(106)
WILTSHIRE—					
† Winsley San.	1904	—	Dr. Alexander	E.	70 ¹
Salisbury Inf.	1766	—	—	A., S.	(120)
GLOUCESTERSHIRE—					
† Cotswold San.	1898	—	Drs. Hoffmann and Traill	E.	60 ²
† Cranham San.	1911	12/6	For Margaret St. H.	E., c.	50
Painswick San.	1900	—	Dr. W. McCall	E.	—
† Salterley Grange San.	1908	—	Dr. P. Mathews	E.	40
Cheltenham Gen. Hosp.	1839	—	—	A., S.	(114)
Bristol Gen. Hosp.	1832	—	—	—	(200)
„ Rl. Inf. [mead	1735	—	—	—	(270)
„ Union Inf. South-	—	F.	—	P. L., m.	27
Bristol Union Inf. Staple-	—	F.	—	P. L., m.	31
ton	—	—	—	P. L., w.	16
Gloucestershire, Stapleton	1755	—	—	P. L., c.	7
Stroud Gen. Hosp.	1790	—	—	—	(140)
HEREFORDSHIRE—					
Hereford Gen. Hosp.	1776	—	—	—	(35)
					(104)

For signs and contractions, see p. 187.

Devonshire.

In this county, separate arrangements have been made for Plymouth and Devonport. Exeter joins with the county in its arrangements. Three main dispensaries have been opened, at Exeter, Barnstaple and Stonehouse, each with six observation beds attached. There is to be a residential school for tuberculous children in connexion with the County Sanatorium. Cases of surgical tuberculosis are sent to the general hospitals.

¹ Being enlarged to 100 beds.

² To be enlarged to 120 beds.

THE WESTERN HOSPITAL FOR INCIPIENT CONSUMPTION, at Torquay, was originally a private house, transformed into a convalescent home for chest complaints, mainly owing to the initiative of the Hon. Mrs. Powys Keck. *Heating* by open fires. *Lighting* by gas. The hospital is open from 1 October till 1 June.

DARTMOOR SANATORIUM,

Chagford, is *situated* on the north-eastern border of Dartmoor, in a sheltered position about half a mile from Leigh Bridge, where the South Teign joins the North Teign River. *Soil*: Granitic. *Altitude*: 750 feet. *Grounds*: 18 acres. *Stations*: Moreton Hampstead, seven miles; Okehampton, eleven miles.

The building is lit by electricity.

UDAL TORRE SANATORIUM,

at Yelverton, between Plymouth and Lydford, has been acquired by the Welsh National Association for Prevention of Consumption. *Soil*: Devonian.

THE DEVON AND CORNWALL SANATORIUM,

Didworthy, near Dartmouth, on South Dartmoor, was erected by the local branch of the National Association Prev. Cons. on a site overlooking the river Avon. *Grounds*: 67 acres, mostly let off on yearly tenancy. *Soil*: Devonian.

The *buildings* consist of a country residence altered for the purpose, a new wing for twenty patients, a house for the medical superintendent, and other bungalows.

The doctor's house is of wood and wirewove structure, and has two rooms for patients paying three guineas a week. *Cubic space* in patients' quarters: 900 cubic feet. *Heating* by hot-water pipes. *Lighting* by electricity.

The building was enlarged in 1911 to sixty-one beds, as a portion of the Plymouth Memorial to the late King Edward.

Financial: Original cost, exclusive of the medical superinten-

dent's house, £7400. The new wing cost £1250. Cost per bed (thirty-five beds), £247.

REFERENCE.—Bulstrode, *loc. cit.*, p. 366.

Somersetshire.

NORDRACH UPON MENDIP,

Blagdon, Bristol, was the first sanatorium opened in England by a patient and assistant of Dr. Otto Walther. It is situated on one of the highest points of the Mendip Hills, which are covered for the most part with moorland, with scattered copses of beech and fir. The road from Langford Station leads through a cleft in the hills, up a long steep ascent, to an elevated tableland between 800 and 900 feet above sea level. The approach to the sanatorium is through a fine avenue of beech-trees, which shelters the house on the south-east side, while the north is protected by a ridge of hills, and woodland forms a shield from the prevailing south-west winds. In front of the house is a large lawn and flower garden, beyond which lies a "dell," a beautiful and peaceful spot even in rough weather. *Grounds*: 65 acres. *Soil*: Limestone and sandstone. *Altitude*: 862 feet.

Buildings: A stone two-story building, originally built for an asylum, but constructed in sanatorium style with rooms in a single row and good cross-ventilation; a wooden dining-hall with windows on all sides (fig. 18), connected by a covered passage with the kitchen; and a colony of wooden one-story bungalows and chalets in an adjoining field. *Heating* by hot-water pipes. *Lighting* by electricity.

Treatment: Strict Nordrach, with tuberculin in some cases.

THE MENDIP HILLS SANATORIUM,

Hill Grove, over Wells, has much the same soil and climate as the foregoing. *Stations*: Wells, Binegar. *Grounds*: 160 acres, including fine woods and meadows. *Altitude*: 853 feet.

Buildings: An ordinary mansion of two stories, and a number of sleeping chalets (fig. 19). These are provided with louver shutters in front in lieu of windows. *Heating* by hot-water pipes. *Lighting* by electricity.



FIG. 18.—NORDRACH-UPON-MENDIP—DINING HALL [Face page 242

Treatment: Formaldehyde inhalations, static electricity, singing exercises, etc.

ST. MICHAEL'S HOME,

Axbridge, was built and endowed by the late Mrs. William Gibbs of Bristol, for consumptives belonging to the Church of England, deemed to be curable. Connected with St. Peter's Home, Kilburn.

THE ENGEL HOME

is intended for those waiting admission to the above.

Wiltshire.

There is a joint sanatorium for Gloucester, Somerset, and Wilts (Winsley Sanatorium). Dispensaries have been opened at Swindon, Salisbury, and Trowbridge, with ten visiting stations.

THE ROYAL VICTORIA MEMORIAL SANATORIUM,

at Winsley, near Limpley Stoke, six miles from Bath, was erected for the use of Gloucester, Wilts and Somerset, Dr. Weatherley being largely instrumental in promoting its erection.

The sanatorium was built on an old quarry, from which the materials for its erection were obtained, and overlooks the valley of the Avon. *Grounds*: Over 50 acres. *Soil*: Great Oolite. *Altitude*: 400 feet.

Buildings: A main two-story block with the administration and quarters for twenty-six patients, built in the usual sanatorium style, with staff-room in the centre on the ground floor, sanitary pavilions on the north side, the rest being patients' rooms in single line served by a corridor behind. *Cubic capacity*: 1500 feet. *Heating* by hot-water pipes. *Lighting* by electricity. Behind the centre of this building is the dining-room with kitchen quarters attached.

Connected with this block by a long rest-shelter is another three-story building composed chiefly of patients' rooms, provided with a deep verandah. There are a number of shelters in the

grounds, and a laundry block with electric-lighting plant. Also a medical officer's villa.

Financial: Total cost £32,000, of which the land cost £2102. The Bristol Corporation contributed £1000, the Bath Corporation £500.

The institution is to be enlarged to 100 beds. Including the medical officer's villa, the cost is estimated at £39,000. Twenty-seven beds are reserved for paying patients. Thirty-nine are owned by various Borough Councils in the three counties.

REFERENCES.—

Bulstrode, *loc. cit.*, p. 526.

"The Hospital," 27 April, 1912.

"Lancet," 5 Oct., 1912.

"Brit. Journal of Tuberculosis," iii. 1, Jan., 1909.

Gloucestershire.

Dispensaries have been opened at Cheltenham, Cinderford, Gloucester, Stroud, and Warmley. Four others are in contemplation.

The city of Bristol has separate arrangements from the county. There are at present twenty-seven beds allotted to Bristol at Winsley Sanatorium; this number will be increased to fifty. The permanent arrangements elsewhere for Bristol will consist of new buildings near the Ham Green Isolation Hospital, in three blocks of twenty beds each, forty for sanatorium and after-care cases, twenty for hospital cases. There may also be arrangements there for children, as well as open-air schools. There is one dispensary in Bristol; another is to be opened.

THE COTSWOLD SANATORIUM,

Cranham Lodge, was originally opened by Dr. Pruen of Cheltenham for the reception of middle-class patients, but has recently become an institution for the insured classes in the county of Gloucester.

It is *situated* near the top of the Cotswold Hills, seven miles from Cheltenham, Gloucester or Stroud, not far from the sources of the Thames and Severn. These hills, which rise in places to over 900 feet above the sea level, are partially covered with pine woods and



beech-trees. The sanatorium is placed in a slight depression near the crest, sheltered by woods and rising ground to the north and east, overlooking the Painswick valley and Minchinhampton common to the south. From the grounds behind the building a view is obtained of the entire Severn valley, the Shropshire hills, the Malvern hills, and the Welsh hills. *Grounds*: 67 acres, including a model farm. *Soil*: Oolitic limestone. *Altitude*: 800 feet.

The *buildings* consist of residential blocks for the patients, with others for the servants, and for the engine- and pumping-house. The main block (originally a private house) is a two-story stone building with attics containing the dining-room, consulting- and staff-rooms, and some of the patients' rooms, and communicating behind with the kitchen department. A corridor runs along each floor, most of the rooms being on the south side. These vary in size, the smallest being 11 feet 9 inches \times 7 feet 9 inches and 10 feet high, mostly nearly double this size. The windows are large French casements with fanlight above and louvre shutters outside. The ceilings and inside walls are covered with enamel-like gloss from petrifying liquid in various colours.

A wide, ventilated verandah runs half round the house.

The other residential blocks are of one story, of wood on stone foundations, with a wooden kitchen block joining them edgewise. This was part of the original sanatorium (fig. 20). The bedrooms are nearly all on the south-west side; behind them runs a corridor, and behind this in each block two other bedrooms, two bathrooms and a passage leading to the back verandah. In front of each wooden block runs a glass-covered verandah, and to the sides and back a narrower one of the same kind. The ends of these verandahs are protected by screens of wood and glass. *Cubic space* of bedroom: 960 feet. In the grounds are numerous shelters, also sleeping chalets. *Heating* by hot-water radiators. *Lighting* by electricity.

THE PAINSWICK SANATORIUM,

on the Cotswold Hills, is four miles from Stroud, six from Gloucester. *Grounds*: 8 acres. *Soil*: Oolitic limestone. *Altitude*: 600 feet.

Buildings: Comprise the doctor's house, dining and recreation hall, kitchen, and a number of chalets. These are mostly of cor-

rugated iron lined with wood, with large windows. The dining-room is provided with eleven sliding windows, and doors on four sides : floor stained and polished, walls and roof stained and varnished. The kitchen is in a separate building connected with the dining-room by a corridor. *Lighting* is by lamps and candles.

The sleeping chalets are raised on brick piers and built with double wooden walls open at the eaves and with felt between. They have windows on every side and ventilators at the gables. The outer walls are painted, the inner ones stained and varnished. Each chalet has two divisions, and a verandah along the front into which beds can be wheeled, and is connected by electric bell with nurses' room. They have no heating apparatus : there is a tortoise stove in the dining-room.

Staff : The resident physician, matron (Mrs. McCall), a trained nurse, etc.

THE SALTERLEY GRANGE SANATORIUM,

near Cheltenham, is intended for cases from the city of Birmingham, and was the first in England entirely owned and managed by a municipality as a part of its organization for dealing with consumption. *Grounds* : 320 acres of farm land, and 60½ acres originally belonging to the mansion house of Salterley Grange. Of this property the mansion (used for administration) and 30 acres are reserved for the sanatorium, the rest being let on lease. *Soil* : Lower Oolite. *Altitude* : 800 feet, grounds rising to 965 feet on the north, and nearly as high on the east.

Buildings : A number of brick one-story pavilions, of which the floors are of coke breeze concrete covered with linoleum, walls of cement and roofs slated. Each pavilion has a nurse's duty-room in the centre, and eight patients' rooms on either side. Behind the centre is a cloak-room, bathroom, lavatory, etc. *Heating* by slow combustion stoves when necessary ; the hot water for the bathrooms being brought from the administration block in felt-covered pipes through concrete trenches. *Lighting* by electricity. The rooms measure 12 feet × 10 feet and have through ventilation.

REFERENCES.—

"British Medical Journal," 31 Oct., 1908.

"British Journal of Tuberculosis," iii. 1, Jan., 1909.

CHAPTER XL.

WALES.

ARRANGEMENTS for combating tuberculosis in this part of the kingdom have been greatly helped by the Welsh National Memorial Fund, raised by Mr. David Davies, M.P., and others, in memory of King Edward VII. Over £200,000 has been collected, and the fund is expected to reach £300,000 eventually.

Sanatorium Benefit under the Insurance Act has been entrusted to the Memorial Committee. Dr. Marcus Paterson has been appointed chief medical officer. A large sanatorium is projected for North Wales with 150 beds, and a similar or larger one for South Wales. Many dispensaries have been opened in various parts of the Principality.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
CARNARVONSHIRE—					
Pendyffryn Hall, Pen- maenmawr	1900	4-5 gs.	Drs. Dobson and Fearnside	E.	28
† Conway and Penmaen- mawr Hosp.	—	—	—	F. H.	—
† Llandudno Smallpox H.	—	—	—	F. H.	—
DENBIGHSHIRE—					
Llanbedr Hall, Ruthin	1901	3-5 gs.	Dr. G. A. Crace Cal- vert	E.	23
Abergele San.	—	F.	S. Manchester Guar- dians	P. L.	50
† Llysfaen Hosp.	—	—	For Colwyn Bay	F. H.	—
ANGLESEY—					
Penhesgyn San.	—	5/	Dr. Grey Edwards	E., w., g.	8
CARDIGANSHIRE—					
† West Wales San., Llany- byther	1908	F., 30/	Dr. H. O. Blanford	E., m. E., w.	40 10
† Aberystwith Hosp.	1838	—	—	G. H.	(28)
GLAMORGANSHIRE—					
Merthyr Tydvil San.	in con.	F.	—	—	40
† Merthyr Hosp.	—	—	For Merthyr Tydvil	F. H.	—
Swansea Boro' Hosp.	proj.	F.	—	—	28
Gwyrfai R. D. Hosp.	—	F.	—	F. H.	32
Cardiff San.	proj.	—	—	—	60
MONMOUTHSHIRE—					
Springfield San., Newport	1907	F.	—	P. L.	37
MONTGOMERYSHIRE—					
† Newtown Inf.	1868	—	—	G. H.	(21)

For signs and contractions, see p. 187.

PENDYFFRYN HALL,

Capelulo, near Penmaenmawr, was originally opened by the late Dr. G. Morton Wilson. It is *situated* between Conway and Penmaenmawr, about 600 yards from the sea, protected by a semicircle of hills. *Soil* : Gravel and sand over slate rock. *Altitude* : 200 feet. *Grounds* : 100 acres, consisting partly of garden and meadow, partly of heather and woodland stretching up the mountain side. There are graduated walks rising up to a height of 650 feet within the grounds, and 1200 feet outside them, commanding extensive views over Anglesey and the Bay of Carnarvon. Some of these are sheltered by hills and in the midst of pine woods, others exposed, so that suitable walks may be found in all weathers.

Buildings : A massively built, square, stone mansion, converted for its present purpose with the least possible alteration. The rooms are grouped round a central hall. They are mostly lofty and large, suitably furnished, with linoleum flooring and no carpets. Windows mostly have the sashes removed, a large fanlight giving some shelter against driving rain. Cross-ventilation obtained by the chimneys ; no fanlights over doors. Kitchen department in the basement ; large dining-room on ground floor. In addition to the main building, there are a few rooms attached to the lodge and two chalets (a third one being built). The latter are of wood and have a verandah and good cross-ventilation. *Heating* by hot-water radiators. *Lighting* by electricity.

Staff : Two medical officers, a secretary, two nurses, fifteen maids. Mrs. Dobson acts as lady superintendent.

THE VALE OF CLWYD SANATORIUM,

Llanbedr Hall, Ruthin, is *situated* on the western slopes of the Clwydian range (1800 feet), overlooking the Vale of Clwyd, with views extending to Rhyl on the north, and Snowdon on the west. *Soil* : Red Sandstone. *Altitude* : 450 feet. *Grounds* : 30 acres, mostly meadow and garden, well protected to the north and east, surrounded by pine woods, meadows and heather land.

The *buildings* consist of a stylish-looking two-story mansion, with an annexe and five chalets. The rooms are all single-bedded,

with from 1000 to nearly 2000 cubic feet; in the annexe there are fanlights over the doors and very large windows. *Heating* is by low-pressure hot water. *Lighting* by electricity.

Staff: Resident physician, matron, nurse and servants.

Patients admitted in 1911: fifty-seven.

THE WEST WALES SANATORIUM,

Llanybyther, eight miles from Lampeter, belongs to the Welsh National Memorial Committee, and is free to residents in Pembrokeshire, Cardiganshire and Carmarthenshire, and to insured patients from any part of Wales; also to paying patients from elsewhere.

It is *situated* on the south side of Allt y Mynydd (the wood on the mountain). *Soil*: Sand and rock (Ordovician). *Altitude*: 850 feet. *Grounds*: 13½ acres, mostly woodland.

Buildings: a two-story main block with one-story wings, of rough-cast stone with red-tiled roof. Behind this, on higher ground, is a separate block for kitchen and dining-rooms, and farther off the stables, laundry with power plant, etc. There is a large day room in the centre of the main building, with rooms for matron and doctor, stores and dispensary, on either side. The bedrooms are in single row, and have large windows (10 feet × 5 feet) with Venetian shutters, and fanlights over the doors. *Cubic space*: 1500 cubic feet. Flooring in bedrooms of linotus on wood, in the corridors and sanitary pavilions (north of the corridor) of terrazzo, in each case with rounded angles. *Heating* by hot-water radiators. *Lighting* by electricity.

Staff: Medical superintendent, sister in charge, staff nurse and probationer, four maids, two men.

Financial: Original cost of buildings (twenty-nine beds): £8000. Cost of maintenance, £1 5s. 9½d. per week, of which food costs 10s. 1d.

REFERENCES.—

Bulstrode, *loc. cit.*, p. 489.

"Brit. Journ. of Tuberculosis," July, 1908 (view and plan).

THE SPRINGFIELD SANATORIUM,

Newport, is *situated* in 5 acres of ground within a short distance from the town. It was originally an ordinary country mansion,

which was altered for its present purpose, and has beds for thirteen men, six women and two children. There are also a fourteen-bed shelter for men, an eight-bed shelter for women, a six-bed shelter for men, and a two-bed shelter for women. Maximum number of beds in a ward is five, excluding the shelters. Electric *lighting*. *Heating* by open fires, only used in very cold weather ; cooking by gas.

Staff: Sister in charge, two nurses and probationer, and three nurses.

Financial: Original cost, £11,000. Cost of food, 6s. 6d. per head per week.

Average stay: Five months.

CHAPTER XLI.

SCOTLAND.

FOR some years past there have been complete arrangements in the more important Scottish towns and cities for dealing with tuberculous cases. Edinburgh has had its dispensary, its sanatorium, its farm colony, its parish hospitals for the less promising cases ; and to a greater or less extent Glasgow and other places have had similar provision. The passing of the Insurance Act has, however, led to a more complete co-ordination of measures all over the country under the Health Authorities, so that in time there will be no weak links in the preventive and curative chain.

Northern Scotland,

comprising the counties north of a line from Loch Leven to Aberdeen.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
ROSS, CROMARTY AND LEWIS— Scaforth San., Dingwall	1908	F.	(Dr. Maclean)	E.	18
INVERNESS COUNTY—					
† Grampian San., Kingussie	1901	3-4 gs.	Dr. de Watteville	E.	20
† Inverness-shire San., Aber- chalder	1907	F. 15/, 25/	(Drs. Johnstone, Mac- donald, and Miller)	—	27
[N. Inf., Inverness]	—	—	—	—	8
† [Inverness Burgh Hosp.]	—	—	—	F. H.	12
ELGIN COUNTY—					
† [Elgin Joint Small-pox Hosp.]	—	—	—	F. H.	8
BANFF COUNTY—					
† [Rose Innes Hosp., Aber- chirder]	—	—	—	S.	7
† [Chalmers' Hosp., Banff]	—	—	—	Pulm. S.	8 48
Turner Memorial Hosp., Keith	1880	—	(Dr. J. Taylor)	E.	24

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
ABERDEENSHIRE—					
† Aberdeen City Hosp. for Inf. Dis.	1874	F. or 25/	(Med. Off. Health)	F.H.,m.	40
[Morningfield Hosp. for Incur.]	1858	—	—	„ w., c. A.	30 (80)
City Poorhouse, Oldmill	1907	F.	—	P. L.	42
Norman Walker Hosp., Fraserburgh	—	—	For County cases	—	12
† The Newhills Conv. Home and San.	1874	—	—	m., w.	26
[Aberdeen Rl. Hosp. for Sick Children]	1877	—	—	c.	(85)
[Aberdeen Rl. Inf.]	1739	—	—	—	(240)
County San.	proj.	—	—	—	50

For signs and contractions, see p. 187.

Ross, Cromarty and Lewis.

THE SEAFORTH SANATORIUM,

Canon Bridge, Dingwall, was the gift of Colonel and Mrs. Stewart Mackenzie of Seaforth. It is *situated* two miles from Dingwall near the village of Maryburgh; not far from Strathpeffer Spa on a ridge commanding a view of the Cromarty Firth and the Black Isle.

Soil: Devonian slate. *Altitude*: 200 feet. *Grounds*: 14 acres, sloping to the south, with wooded knolls and sheltered hollows.

Buildings: A central three-story block for matron and nurses, dispensary and pathological research room, with one-story wings for the two sexes at a slight angle. The end rooms are extra large, but otherwise all the bedrooms are alike, with pitch-pine floors, rounded corners, etc. There is a terrace in front. A sanitary pavilion is placed behind the centre of each wing. The dining-room (30 feet × 20 feet), kitchen quarters and laundry are in a separate block behind the centre. *Lighting* by electricity.

Admission: Apply to the secretary. Free to patients from the district in an early stage who cannot afford the fees of pay sanatoria. One-third of the beds are reserved for the Island of Lewis.

Financial: Cost of buildings, etc., £8000; endowment of, £100,000.

REFERENCE.—“Brit. Journ. of Tuberculosis,” July, 1908 (plan and view).

Inverness-shire.

There has been a tuberculin dispensary in Inverness since 1910. Advanced cases are admitted to the local small-pox hospital; but it is proposed to build a special ward at the new fever hospital.

THE GRAMPIAN SANATORIUM,

Kingussie, is situated in the Upper Speyside district, in the valley of the Gynock, three miles from Kingussie, with the Monaliadh Hills to the north and the main Grampian range to the south-east, seven miles away. The building is in a level clearing, sheltered to west-north-west and north-east by rocks and woodland. *Soil*: Glacial drift overlying mica schist. *Altitude*: 860 feet. *Grounds*: 10 acres, partly woodland, chiefly Scotch pine with some larch and birch.

Buildings: A stone-built house of two stories. All the patients' bedrooms are south of the corridors. Most of these rooms are 13 feet \times 10 feet 9 inches \times 10 feet 9 inches. The end rooms on the ground floor, which are 24 feet \times 19 feet 6 inches, are used as dining- and drawing-rooms. Above these are a pair of narrow long rooms, one of each pair facing to the sides of the house. The corridors are 7 feet wide. Behind on the ground floor is at one end the kitchen department, at the other the doctor's quarters, gentlemen's bathroom and a store-room; centrally the entrance, two staircases, lavatories, bathrooms, and W.C.'s. On the upper floor, servants' rooms are over the kitchen, the rooms for matron and nurses over the doctor's rooms. Two gaps are left between the rooms on each floor for ventilation; but most of the space north of the corridors is occupied. The patients' bedrooms have floors of stained and polished wood, walls painted with duresco, rounded angles and specially designed furniture. The windows are mostly sash windows, with a rounded revolving fanlight above, and similar ones over the doors. In the centre are a few with covered verandah or balcony, and these have French casements. The rooms and hall are *heated* by open fires, the fireplaces in bedrooms occupying part of the south side. *Lighting* by electricity.

Staff: Medical director, Dr. de Watteville; matron, Mrs. de Watteville; two nurses, etc.

THE INVERNESS-SHIRE SANATORIUM,

Aberchalder, is *situated* on the edge of a deer forest, in a wood of oak and birch, overlooking the River Oich near the Caledonian Canal. Sheltered by hills and woods to the north and east; the ground slopes to the south towards the valley, with heather land beyond. *Soil*: Gravel and sand. *Altitude*: 211 feet.

Buildings: Of wood and iron on stone foundations. Two separate buildings, one for administration, containing the kitchen quarters, staff-room, etc., the other for the patients. A large dining-hall connects the two. Built on the Kelling system, with projecting eaves and no corridor.¹ Wards 12 feet \times 11 feet and 11 feet \times 9 feet, windows (or doors) like those at Kelling. At the end of the men's wards is a large day room. The women use the dining-hall as a day room. There are two single-bedded and eight double-bedded rooms, and two rooms for matron and nurse respectively. Lavatories and bathrooms in a projecting wing at the east end. Two additional shelters, each for two beds. *Lighting* by acetylene.

Terms: Up to 15s. per week, according to means, some paying nothing. Only patients from the county admitted.

Staff: Visiting medical officers: Dr. Johnston of Fort Augustus, Dr. Macdonald, M.O.H. for Inverness-shire, and Dr. Miller of Fort William. Resident staff: a matron, nurse, two maids and a gardener.

Secretary, Miss Davy, Spean Bridge, N.B.

REFERENCE.—"Tuberculosis," Vol. IV, No. 6, June, 1908.

¹ See p. 214.

CHAPTER XLII.

CENTRAL SCOTLAND.

NORTH of a line from the Firth of Forth to the mouth of the Clyde,
south of a line from Loch Leven to Aberdeen.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
KINCARDINESHIRE—					
Banchory San.	1900	5 gs.	Dr. Lawson	E.	74
Jt. San. for Aberdeen, Kincardine and Banff	proj.	—	—	E.,m.,w. E., c.	100 40
FORFARSHIRE—					
† Sidlaw San., Auchterhouse	1903	—	—	E.,m.,w. E., c.	24 30
Balgarres San., near Forfar	—	F.	—	E., m.	12
† [Joint Infect. Hosp., Ar- broath]	—	—	—	F. H.	6
† [Joint Infect. Hosp., Forfar]	—	—	—	F. H.	4
† Forfar Infirmary	1862	—	—	S.	(44)
† Arbroath „	1845	—	—	S.	(40)
Brechin „	—	—	—	S.	—
Dundee Royal Infirmary	1798	—	—	S.	(400)
† Montrose Royal „	1781	—	—	S.	(45)
† [King's Cross Hosp., Dundee]	1889	—	—	F. H.	30
PERTHSHIRE—					
† Hillside Homes, Barnhill	1901	20/	Dr. D. H. Stirling	E. A.	19 21
Children's Home Hosp., Aberfoyle	1903	up to 2/6	For Glasgow Hospi- tals	S.	21
Ellerslie, Comrie Road, Crieff	—	3-3½ gs.	Dr. Thompson Camp- bell	—	—
Knocksualtach San., Pit- lochry	—	4 gs.	Dr. Mary Nannetti	c.	—
† Dunblane Cons. Hosp.	—	F.	—	—	6
† Perth Royal Inf.	1838	—	—	S.	(110)
† [Perth Boro' Isol. Hosp.]	—	—	—	—	8
† Crieff and District Cott. Hosp.	—	—	—	S.	—
ARGYLLSHIRE—					
† Argyll Co. San., Oban	—	42/	—	—	30

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
FIFESHIRE—					
† Kirkcaldy Burgh San.	1908	F.	Med. Off. Health	F. H.	14
† [Muircockhall Small-pox Hosp., Dunfermline]	—	—	—	F. H.	20
† [St. Michael's Hosp., Leuchars]	—	—	—	F. H.	14
† [Ovenstone Inf. Dis. Hosp.]	—	—	—	F.H.,w.	6
† [Thornton Small-pox „]	—	—	—	F.H.,m.	18
Dunfermline and West Fife Hosp.	1894	—	—	S.	(45)
KINROSS-SHIRE—					
Ochil Hills San.	1902	3½-4½ gs.	—	—	60
† Coppins Green San.	—	30/	—	E., m.	15
CLACKMANNAN—					
† [Clackmannan Co. Hosp.]	1868	—	—	S.	(24)
STIRLINGSHIRE—					
† [Falkirk Inf.]	1889	—	—	S.	(42)
† Stirling Royal Inf.	1874	—	—	S.	(35)
† [Stirling Royal Inf. Conv. Home]	—	—	—	S.	—
DUMBARTONSHIRE—					
† Lanfine Home, Kirkin- tilloch	1904	F.	—	A.	44
[Broomhill Home, Kirkin- tilloch]	—	—	—	S.	—
† [Helensburgh Small-pox Hosp.]	—	—	—	F. H.	10
† Victoria Inf., Helensburgh	1880	—	—	S.	—
† [Helensburgh Inf. Dis. Hosp.]	—	—	—	—	5
Schaw Mem. Home, Bears- den (Conval. Home)	—	—	For Glasgow Rl. Inf.	S.	—
Rl. Hosp. Sick Children	—	—	—	S., c.	(26)
Agnes Miller Wilson Home, Shandon, Gare- loch	—	—	—	S., c.	(56)
Sick Ch. Conval. Home, Dullatur	—	—	—	S., c.	—

For signs and contractions, see p. 187.

Kincardineshire.

THE BANCHORY SANATORIUM,

or Nordrach on Dee, is *situated* between Aberdeen and Ballater, in the midst of a pine forest, protected to the north by a range of hills rising to 1540 feet, on other sides by the woods. Goch Hill (1100 feet) is to the south, the Grampians are far to the west. *Soil*: Porous red gravel. *Grounds*: 25 acres, laid out in walks of



FIG. 21.—THE BANCHORY SANATORIUM

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known gradients, indicated by colour bands on the trees, furnished with seats and shelters.

Buildings: The main building is on three floors, with a central higher tower, and is only one room and corridor deep. The ground floor contains a large drawing-room, another smaller room used as a library and waiting-room, dental-room, chart-room and dispensary, consulting-room and bedrooms. In front of it is a glass-covered verandah. This building is continued eastwards by a more recent extension, provided with an open-air shelter on the ground floor and balconies on the two upper floors. The bedrooms have large French windows occupying over two-thirds of the wall space, with fanlights above and louvre shutters outside. Similar windows are found along the corridors and similar fanlights over the bedroom doors. Each bedroom has douche bath and two fitted-in basins, served with hot and cold water, rounded angles, walls painted in colours, floors of polished wood. As a protection against damp and fire, a four-inch thickness of silica wool has been placed in every wall. In projecting pavilions, north of the corridors are W.C.'s, lavatories and bathrooms; a number of plunge, shower and sitz baths are provided there. On the middle corridor is a throat-room. There are two lifts. *Heating* by steam pipes. *Lighting* by electricity (fig. 21).

The dining-room, together with kitchen department and servants' bedrooms form a separate block 50 feet to the eastward, connected with the main building by a continuation of the corridor which has in front of it an open glass verandah. The dining-room, 55 × 24 feet, has on three sides large windows opening outwards.

The engine-house is 100 feet from the main building, shut off by densely wooded ground. The machinery is duplicated in case of accidents. West of this block is the residency, with quarters for the medical officers, matron and nurses. There is a fully equipped laboratory under a clinical pathologist at a distance from the main building, and a completely equipped electrical department within the main building, for X-ray, high-frequency current and ultra-violet light treatment, etc.

Staff: Four resident medical officers, consulting laryngologist

and dentist, matron, nine nurses, and servants, in all numbering over seventy.

Financial: Cost of erection, over £600 per bed.

Forfarshire.

THE SIDLAW SANATORIUM,

Auchterhouse, was founded by A. H. Moncur, ex-Provost of Dundee, and partially endowed. It was transferred in 1910 to the Directors of the Dundee Royal Infirmary.

Situation: On the Sidlaw Hills, protected to the east and north by pine and heather-clad hills, with a fine view over the River Tay, the Fifeshire and Midlothian hills. To the west are Schiehallion and the Perthshire mountains. *Soil*: Volcanic. *Altitude*: 800 feet. *Grounds*: 21 acres, provided with shelters, one of which is about 200 feet above the sanatorium.

Buildings: A two-story stone building, with attics. Bedrooms are all on the south side, well finished in the approved style. Twenty-eight are single-bedded, the rest for three beds apiece. *Heating* by low-pressure steam. *Lighting* by electricity.

The kitchen department and dining-room are in a separate building connected with the patients' quarters by a covered way. The laundry and engine-house are in yet another building; there are also an engineer's house and stables (fig. 22).

Perthshire.

THE HILLSIDE HOMES CONSUMPTION HOSPITAL,

Barnhill, Perth, was built at the expense of Sir Robert Pullar, and is *situated* on the western slope of Kinnoul Hill, with a southerly aspect, sheltered from north and east. *Soil*: Devonian slate rock.

Preference to natives of, and residents in, Perthshire.

Financial: There is an endowment of £17,422.

Argyllshire.

THE ARGYLL SANATORIUM,

at Oban, is *situated* on an estate of 9 acres, at a height of 400 feet above the sea level, in the midst of beautiful scenery.

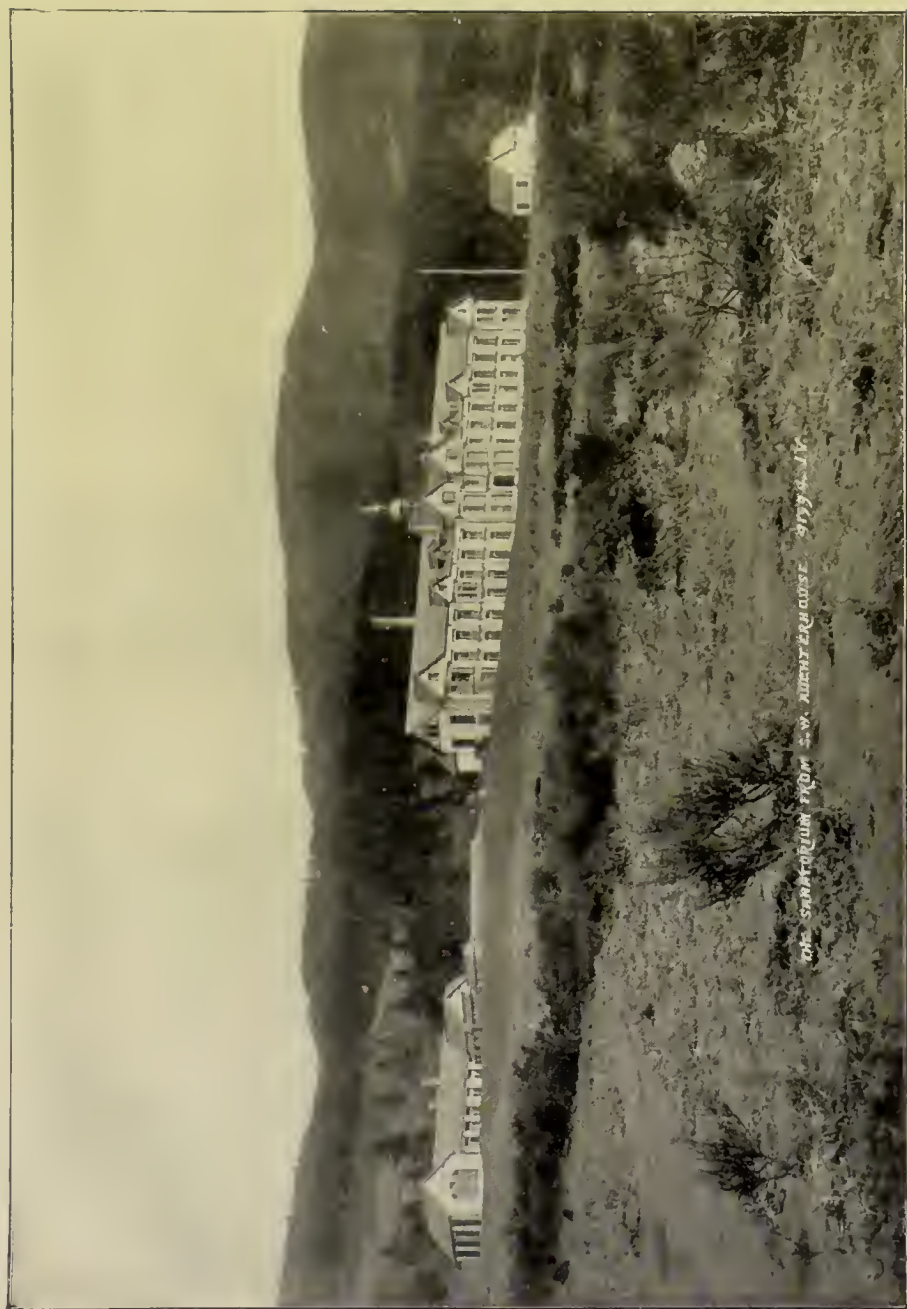
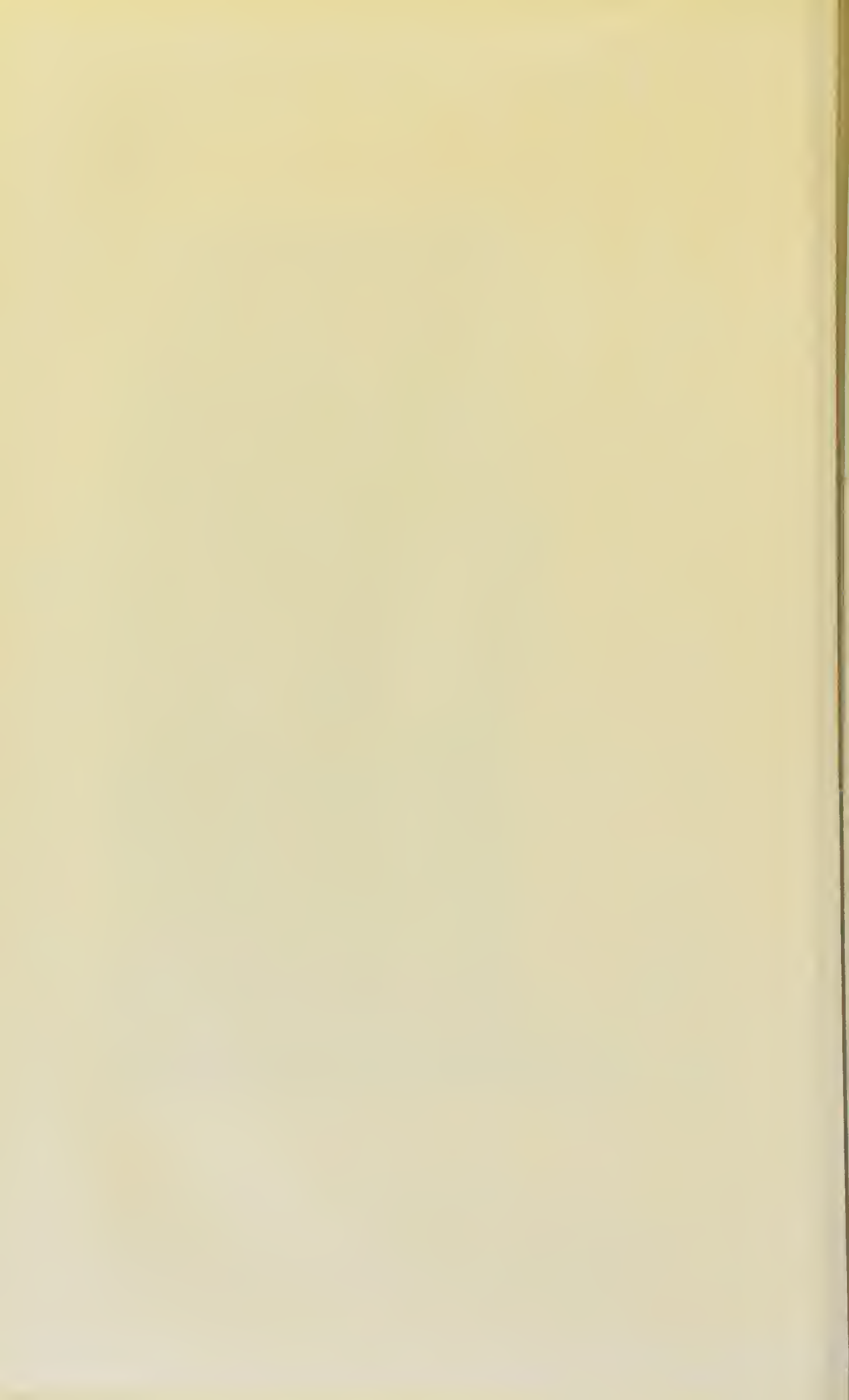


FIG. 22.—THE SIDLAW SANATORIUM

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The *buildings* consist of a mansion, used for administration, and several one-story buildings containing the wards and common rooms.

Fifeshire.

THE KIRKCALDY BURGH SANATORIUM

was the first sanatorium built by a local authority in Scotland. Cost of building with furniture: £1700.¹

Kinross-shire.

THE OCHIL HILLS SANATORIUM,

Milnathort, four miles from Kinross Junction, is *situated* on the southern slopes of the Ochil Hills, overlooking Loch Leven, protected to the north, north-east and north-west by wooded hills, some of which rise 260 feet above the sanatorium. *Soil*: Volcanic. *Altitude*: 800 feet. *Grounds*: 400 acres, including 60 acres of moorland, pinewoods, pasture, a home farm, and an ornamental lake and a boating pond, with beautiful views of loch and mountains. The paths rise to 1000 feet above sea level.

The *building* is of three stories with basement at one end. The patients' bedrooms occupy (with a few exceptions) the south side of the three corridors, behind which are to be found in three pavilions the nurses' rooms, bathrooms and lavatories, electrical-room, consulting-rooms, and on the ground floor the music-room, all beautifully and suitably finished.

The kitchen department occupies a partially separated block behind the centre of the ground floor, to which is attached the laundry, boiler-house, and electric plant, with a wing for the medical officer's quarters. Over the boiler-house and laundry is the dining-room; and over this are staff bedrooms. The dining-room is reached from the first-floor corridor. *Heating* partly by open fires, mainly by low-pressure steam pipes. *Lighting* by electricity. There is a complete electrical installation for treatment; spray, shower, plunge and sitz baths on every corridor, and a lift for patients.

¹ "Brit. Med. Journal," 10 Oct., 1908.

There are three common rooms in addition to the dining-room ; in the basement are a photographic dark room, laboratory, dispensary, inhalation-room, boot-room, heating-chamber, and a few staff rooms.

THE COPPINS GREEN SANATORIUM

was opened in Essex by Dr. J. E. Chapman as a working sanatorium in which patients are credited with the wages earned, and debited with the cost of residence, reckoned at 30s. per week. It was transferred later to the grounds of the Ochil Hills Sanatorium.

Dumbartonshire.

THE LANFINE HOME FOR INCURABLE CONSUMPTIVES,

Kirkintilloch, is *situated* near the Glasgow Home for Incurables, Broomhill, at the base of the Campsie Hills, on limestone soil.

Buildings : Originally consisted of two wards of eight beds each, and two single-bedded rooms, together with a two-story administration block between. In 1910 an additional building was erected of frazzi blocks on steel framework (see Benenden Sanatorium), covered outside with rough-cast. A new nurses' home has also been erected for the joint use of this institution and the Broomhill Home for Incurables.

CHAPTER XLIII.

SOUTHERN SCOTLAND.

COMPRISING the portion south of a line from the Firth of Forth to the mouth of the Clyde.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Admitted.	Beds.
RENFREWSHIRE—					
† Bridge of Weir San.	1898	15/ or F.	—	E., m., w., c.	140
Coats' Fresh Air Homes, Paisley	1911	—	—	E.	15
† Gockston Small-pox Hosp., Paisley	—	—	—	A.	22
† [Johnstone Comb. Hosp., Kilbarchan]	1908	—	—	F. H.	33
† [Paisley Burgh Fever Hosp.]	—	—	—	F. H.	8
† [Greenock Comb. Hosp., Gateside]	1912	—	—	F. H.	15
† [Greenock Hosp. and Inf.]	1806	—	—	S.	(140)
† [West Renfrewshire Small-pox Hosp.]	—	—	—	F. H.	17
† [Blawarthill Hosp.]	1913	—	—	F. H.	16
Paisley Rl. Alexandra Inf.	1786	—	—	S.	(140)
AYRSHIRE—					
† Ayrshire San., Glenafton	1906	F.	Dr. E. E. Prest	m.	40 ¹
Kilwinning Small-p. Hosp.	—	—	—	A.	20
Troon " "	—	—	—	A.	4
Cumnock " "	—	—	—	A.	8
Dinvie " "	—	—	—	A.	4
† Heathfield Hosp. Pav.	1909	—	For Ayr	A.	20
Kaimshill Hosp.	1910	—	For Kilmarnock	A.	16
Ayr County Hosp.	1843	F.	—	S.	(76)
Kilmarnock Royal Inf.	—	—	—	S.	(150)
Biggart Mem. Hosp., Prestwick	—	—	—	S., c.	(140)
LANARKSHIRE—					
† Stonehouse San.	—	—	—	E.	40 ²
† Shotts Hosp.	—	—	—	All	32 ³
† Uppertown San., Longriggend	—	—	—	All	32 ³

¹ To be enlarged to eighty beds.

² To be enlarged to eighty beds.

³ Being enlarged to fifty-two beds.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
LANARKSHIRE cont.—					
† Bothwell Hosp., Bellshill	—	—	—	m., w., c. S.	30 ¹
† County Fever Hosp., Motherwell	—	—	—	—	—
† Bellefield San., Lanark	1904	7/6 var.	(For Glasgow, Dr. Allen)	E., M.	53
† [Knightswood Hosp., Anniesland]	—	—	—	F. H.	16
† [Lightburn Hosp.]	—	—	—	F. H.	20
† [Motherwell Inf. Dis. Hosp.]	—	—	—	F. H.	18
† [Upper Ward Dist. Hosp., Carluke]	—	—	—	F. H.	12
† [Shield Hall Hosp., Govan]	—	—	—	F. H.	20
† [Airdrie Burgh Recept. Hosp.]	—	—	—	—	7
† [Ruchill Hosp., Glasgow]	1900	—	—	F. H.	32
† Douglas Cott. Hosp. San.	—	—	—	—	8
† " " " "	—	—	—	S.	—
Royal Hosp. Sick Child., Glasgow	1882	—	—	S.	(74)
Royal Inf., "	1791	—	—	S.	(580)
Victoria Inf., "	1890	—	—	S.	(260)
Western Inf., "	1874	—	—	S.	(550)
DUMFRIESSHIRE—					
† [Dumfries Burgh Small- pox Hosp.]	—	—	—	F. H.	8
† [Lochmaben Jt. Hosp.]	—	—	—	F. H.	12
† [Thornhill Inf. Dis. Hosp.]	—	—	—	F. H.	4
† [Dumfries and Galloway Royal Inf.]	—	—	—	S.	—
† Westmorland Cons. Hosp.	—	—	See Lancashire	—	—
LINLITHGOW—					
Tippethill Small-p. Hosp.	—	—	—	F. H.	12
EDINBURGH COUNTY—					
† Edinburgh City Fever Hosp., Colinton Mains	—	—	—	A.	74 ²
† East Pilton St. Hosp., Leith	—	—	—	F. H.	20
† Royal Victoria Hosp.	1894	—	—	E.	100
† Edinburgh Hosp. Women and Children	—	—	—	S.	—
Woodburn San.	1899	4-5 gs.	Dr. Isabella Mears	E.	25
Bonaley Cott. San., Colin- ton	—	30/	(Dr. D. W. Scotland)	—	5
PEEBLESSHIRE—					
† Manor Valley San.	1904	2½ gs.	Dr. W. W. Harrison	E.	17
SELKIRKSHIRE—					
† Meikle San., Galashiels	1907	F.	—	E.	8
HADDINGTON COUNTY—					
† Haddington Co. Small- pox Hosp.	—	—	—	F. H.	8
ROXBURGH COUNTY—					
† Anderson San., Hawick	—	5/	—	—	10
† [Hawick Cottage Hosp.]	—	—	—	S.	—

¹ Being enlarged to sixty-two beds.² Being enlarged to 112 beds.

For signs and contractions, see p. 187.

Renfrewshire.

The boroughs of Paisley and Greenock have separate tuberculosis arrangements under the Insurance Act. Other boroughs are merged in the county area for this purpose. There are tuberculosis dispensaries in Paisley and Greenock. Children are admitted into the Bridge of Weir Sanatorium. This institution and the Coats' Fresh Air Homes are the only sanatoria for early cases.

THE CONSUMPTION SANATORIA OF SCOTLAND,

Bridge of Weir, are *situated* in hilly country about eighteen miles from Glasgow. *Soil*: Limestone. *Altitude*: 260 feet.

Buildings: Nestling amongst the hills are an old and a new patients' block, an administration building, with laundry, powerhouse, etc., and the secretary's residence. The old block is a handsome stone building of two stories, with an additional one in the centre. Patients' rooms are nearly all on the south side, the corridor to the north, with a handsome marble vestibule in the centre, and lavatories at the ends. The bedrooms are floored with polished boards, the angles next the walls being rounded with a bold curve. Walls are washable, furniture simple, and fittings fairly free from dust-retaining ledges, although the whole building is beautifully and almost luxuriously fitted up. The walls are double and the windows were also double, the ventilation being originally by means of warm air by propulsion. It was, however, soon discovered that this was a hindrance to treatment, so that the inner windows have been everywhere removed, and simpler methods adopted. The ground floor, originally day rooms, has been transformed into wards. The dining-room is on the first floor. In the basement are bathrooms, and space for the heating apparatus, together with cloak-rooms.

The newer block is the same style as the first, but with some modifications and improvements. A new kitchen department has been built behind the centre of the corridor. On the roof is a Mann's extraction flue. There are about a dozen beds for men in a separate house in the grounds. A doctor's house is projected. Patients are sent from a dispensary in Glasgow.

Ayrshire.

The county sanatorium at Glen Afton is to be considerably enlarged. It is proposed to set aside sixty-seven beds in six of the Small-pox Hospitals for more advanced cases of pulmonary tuberculosis.

THE AYRSHIRE SANATORIUM,

Ashmark, Glen Afton, is *situated* on the north side of Carcow Glen. *Station*: New Cumnock.

Originally founded by private subscription, it was transferred in 1908 to a combination of Public Health Authorities. *Grounds*: 55 acres. *Soil*: Limestone. *Altitude*: 800 feet.

Buildings: Consisted originally of two one-story buildings with a south aspect, united by rest-galleries. To the north is another line of buildings running parallel to the first, containing kitchen and dining-room, and between the two sets of buildings are passages, and an administration block of two stories. When the sanatorium was handed over to the Health Authorities, it was enlarged to double the original capacity, two more one-story buildings being added still farther north, forming an obtuse angle with one another, the eastern portion looking south, the western south-west. A covered passage runs from the angle of junction to the original building, and beside it is a nurses' block. In each section the patients' quarters consist of single-bedded rooms, with corridor to north and sanitary pavilions on the far side of it. Attached to the dining-room is a day room. *Lighting* by electricity.

Admissions in 1911-12: 126; under treatment: 173. *Average stay*: 96 days.

Cost of maintenance: £1 7s. 5d. per week per bed.

Lanarkshire.

Apart from the County Boroughs, there is one dispensary in this county, at Blantyre, with ten observation beds.

The accommodation for tuberculous cases is being rapidly increased. The chief sanatorium for the county is the Stonehouse Sanatorium; for Glasgow the Bellefield. Already in 1911 Glasgow

provided 540 beds for advanced cases in the parish hospitals of Glasgow and Govan, as well as 236 beds in the neighbouring sanatoria—Bridge of Weir, Bellefield and Lanfine.

THE BELLEFIELD SANATORIUM,

Lanark, is *situated* in 27 acres of ground in a well-sheltered situation. *Soil*: Limestone. *Altitude*: 600 feet.

It was founded by the Glasgow and District Society for Prevention of Tuberculosis.

Buildings: A pre-existing house with quarters for medical officer, matron and staff; and wooden pavilions and chalets for the patients. Each pavilion is of wood and iron (Spiers & Co.). It contains to the left a projecting wing with a south-east aspect, containing a ward for ten patients, five double-bedded rooms in the centre, and to the right a large dining-room. Each of the smaller rooms has a large three-sided bay window with French casements; on the door is a fanlight. Behind the rooms is a wide corridor with numerous French casement windows. Near the patients' entrance is a large examination room. Behind the main pavilion is a block with kitchen department. The lavatories and cloak-rooms are in separate projections. All angles inside are rounded, walls panelled and varnished.

The chalets are double-bedded.

Patients admitted year ending September, 1912: 165.¹

Edinburgh.

There is a complete organization in this city for dealing with pulmonary tuberculosis, from the dispensary through the sanatorium and the hospital to the farm colony. Advanced cases are taken to the City Hospital, or if paupers to the Parish Hospital.

THE ROYAL VICTORIA HOSPITAL FOR CONSUMPTION,

Craigleith, is *situated* in the northern outskirts of Edinburgh, surrounded by open fields. It was founded chiefly through the exertions of Sir R. W. Philip, the senior visiting physician. *Grounds*: 17 acres, consisting of lawns and flower-beds sloping

¹ "Brit. Med. Journal," 15 March, 1913.

south, surrounded by woodland. *Soil*: Sand overlying rock. *Altitude*: 150 feet.

Buildings: Originally a private mansion, but has been much altered and added to. The original building has ordinary guillotine windows, painted walls, and polished floors; attached to it is a new and lofty dining-hall. The annexes, three of which were opened in 1903 and two in 1907, are Y shaped, with a nurses' room and sanitary pavilion behind and two diverging wards in front with beds for four to six patients (fig. 23). They are of one story, with the floor raised about 3 feet above the ground, built of brick, cemented inside with rounded angles, large steel casement windows with fanlights over forming most of the outer surface. The floors are of wood on cement slabs. *Cubic capacity*: 1000-1200 cubic feet. A nurses' kitchen is placed in the wedge-shaped space between the diverging wards. There is one bathroom to every four patients, and a common lavatory and a cloak-room, all tile-lined. The *heating* is by open fires, the *lighting* by electricity, which is also laid on to the shelters in the grounds. No verandahs or balconies. The engine-house with tall chimney is placed on the north side behind tall trees. Simple furniture of suitable kind is provided; glass-covered pedestals with open metal shelves, narrow reclining couches with horse-hair mattresses covered with waterproof, being used outside. A number of small sleeping shelters have been erected in the grounds to temporarily increase the accommodation. Each of these has two beds; the roof is of corrugated iron, the front is open, the sides glazed. In these patients are quite comfortable, even in winter.

REFERENCE.—"British Journal of Tuberculosis," Oct., 1907, Oct., 1908.

THE EDINBURGH FARM COLONY

in connexion with the Royal Victoria Hospital for Consumption is at Springfield, near Lasswade and Polton. It was opened in 1910 in a well-wooded district, a mansion with 50 acres of ground having been acquired for the purpose. *Altitude*: 280 feet.

THE EDINBURGH TUBERCULOSIS DISPENSARY,

Lauriston, opened in 1887, receives £450 per annum in return for information supplied to the Medical Officer of Health.¹

¹ "Brit. Med. Journal," 19 March, 1910.



Marshall Wane & Co., Photographers

INTERIOR OF NEW PAVILION, SHOWING ARRANGEMENT OF BEDS IN RELATION TO OPEN WINDOWS

FIG. 23.—THE ROYAL VICTORIA HOSPITAL FOR CONSUMPTION

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THE EDINBURGH CITY HOSPITAL,

at Colinton Mains, sets aside fifty beds for advanced and dying cases of consumption¹ from the city alone. It is being enlarged.

THE WOODBURN SANATORIUM,

Morningside, Edinburgh, is *situated* close to the open country, sheltered by the Blackford Hills, and facing the Braid and Pentland Hills. *Grounds*: 6 acres, well wooded with fine trees. *Soil*: red sandstone.

Buildings: Originally a stone mansion, which now contains dining-room, drawing-room, and administration, together with a few large, airy bedrooms. In the garden is a pavilion with twelve more bedrooms. It is of wood on brick piers, is covered with oak shingles, lined with felt, and internally faced with match boarding. The rooms are 14 ft. 9 in. × 10 ft. 10 in. × 10 ft. 10 in. high, and have extra large casement windows surmounted with fanlights. They are all to the south of the corridor, and have similar fanlights over the doors. The floors are waxed and polished, the walls varnished, the furniture suitable. To the south of the corridor are a small kitchen, lavatories, and W.C.'s. The roof is ventilated all round. *Heating* is by hot-water pipes and open fireplaces; *lighting* by electricity. There are also a few sleeping chalets, each with a dressing-room attached. They are open front and back, provided with louvre shutters, and connected with the house by electric bells.

¹ "Brit. Med. Journal," 27 June, 1908.

CHAPTER XLIV.

IRELAND.

THE arrangements for providing sanatorium benefit in this country have been entrusted to the Women's National Health Association. There are no county health officers in Ireland, so that the preventive machinery has had to be organized to a greater extent than in England or Scotland.

Name and Locality.	Opened.	Terms per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
ULSTER—					
Antrim Co.—					
Forster Green Hosp.,	1897	10/, 15/ with L.	Dr. Chas. Alexander	E., m.	39
The Abbey San., „	1907	F.	(Dr. R. Hall), Dr. Morgan	E., w. E., A.	37 120 ¹ 145
Down Co.—					
Rostrevor San.	1899	3-3½ gs.	Dr. B. H. Steede	E.	23
Fermanagh Co.—					
Rossclare San., Killadeas	—	—	—	—	—
LEINSTER—					
Wicklow Co.—					
Royal Nat. Hosp. Cons., Newcastle	1896	7/ with L. 21/ to 30/	—	m. w.	100
Dublin Co.—					
Larch Hill San.	1906	2-3 gs.	Dr. R. C. Nicholl	E.	12
Peamount San., Lucan	—	—	Dr. Allan Hanley	—	—
South Dublin Inf.	—	—	—	P. L.	—
Crooksling San.	1911	F.	Dublin Jt. Hosp. Bd.	E.	50
Allan A. Ryan, Home Hosp.	1910	F., 7/, 15/	—	A.	35
The Preventorium, Sutton	—	—	—	—	—
Queen's Co.—					
Queen's Co. San., Mary- borough	1911	—	Burnt down Nov., 1912	E.	12
MUNSTER—					
Clare Co.—					
County Clare San.	1912	21/	—	—	6
Cork Co.—					
Cork San., Doneraile	1910	F., 15/, 21/	Dr. R. Aherne	E., m., w.	80
CONNAUGHT—					
Galway Co.—					
County Galway San.	in con.	—	—	—	—
Connaught San.	in con.	—	—	—	—

¹ Seventy more beds being added.

For signs and contractions, see p. 187.

THE FORSTER GREEN HOSPITAL FOR CONSUMPTION AND
DISEASES OF THE CHEST,

Fortbreda, Belfast, was founded by the late Mr. Forster Green. It replaced the Belfast Hospital for Consumption, founded in 1880. It is *situated* on a western slope overlooking Belfast, surrounded by villa residences. *Soil*: Sand. *Altitude*: 200 feet. *Grounds*: 40 acres, well wooded, with sheltered walks and rest-shelters.

Buildings: Originally a private mansion of two stories, to which additions have been made. The dining-saloon and kitchen department are on the ground floor, a large board-room and four wards on the first floor, bedrooms for nurses and matron with seven wards on the second floor, bathrooms and servants' rooms in the attics. The wards (two to five bedded) have large double-hung windows, distempered walls, floors covered with linoleum or of polished pine-wood or stone. There is a conservatory and deep verandah along the south side. Ventilation is by open windows, the plenum system having been abandoned. *Lighting* by electricity. Shelters in the grounds. *Out-patient* department in Belfast.

Terms: 10s. to 15s. per week with life members, letter of recommendation. A few free beds. A life member paying £1000 has a bed always at disposal.

A donation of £50 entitles to one in-patient and four out-patient letters annually.

Staff: Resident physician, Dr. Charles Alexander. Eleven honorary visiting or consulting physicians and surgeons. Secretary, 2 Wellington Place, Belfast.

THE ABBEY SANATORIUM,

Whiteabbey, about five miles from Belfast, is *situated* in 33 acres of gardens and pine-woods, 140 feet above sea level. It is intended for Poor Law patients. *Subsoil*: Clay.

Buildings: Originally a hydropathic establishment, now used for the administration, and as quarters for medical officers and nurses. A number of red-brick one-story pavilions have been added, one of which ("the hospital") consists of a central two-story block with wings advancing on either side, containing four wards of twenty-five

beds apiece and ten smaller ones, and furnished with bay windows and verandahs. This building is for the reception of the patients in the first instance. The other pavilions, for the slighter cases, each contain twenty-five to thirty beds and a central sitting-room, and have casement windows and glass-covered verandahs. Floors of pitch pine. *Heating* by low-pressure hot-water pipes. *Lighting* by electricity.

Financial: Cost of mansion and estate, £5000; cost of four pavilions for early cases, hospital and necessary adjuncts, £32,000. Total cost £39,000. Weekly cost, about 17s. 4d. per head.

Staff: Two visiting medical officers, two resident medical officers, lady superintendent, twenty-five sisters, nurses and probationers. The management is at present in the hands of the Board of Guardians.

Patients treated in 1911: 553; *discharged*: 288. *Average stay*: four and three-quarter months.

REFERENCES.—

"Brit. Med. Journal," 5 Oct., 1907.

"Brit. Journ. Tub.," Jan., 1908 (view).

THE ROSTREVOR SANATORIUM,

Warrenpoint, is *situated* on a western slope among the Mourne Mountains, three and a half miles from Rostrevor village, two miles from Carlingford Bay. The Mourne Mountains rise to a height of 2700 feet to the north and east. *Soil*: Gravel overlying granite. *Altitude*: 350 feet. *Grounds*: Well wooded with pine and larch, with walks of various gradients, rising about 200 feet in all, some lit by electricity.

The building consists of two parts at right angles to one another, a picturesque timber structure with two stories and a red-tiled roof, with balcony on first floor and a covered verandah at the end connecting it with the doctor's house and servants' rooms, kitchen and offices. The rooms have casement windows. On either side in the grounds are eleven bungalows or sleeping chalets, facing due south, and protected from strong winds.

There is electric *lighting*. *Heating* is by hot-water pipes and

open fireplaces. The X-ray apparatus, high-frequency current and massage are all employed when indicated.

Staff: A resident medical officer, three nurses, etc.

ROSSCLARE SANATORIUM,

Killadeas, is said to be in a very exposed situation where trees grow badly, and on heavy impervious soil without facilities for farm work or kitchen gardens. It has however been bought by the Women's National Health Association with a view to making it a county sanatorium.¹

THE ROYAL NATIONAL HOSPITAL FOR CONSUMPTION FOR IRELAND,

Newcastle, Co. Wicklow. *Station*: Newcastle, D. & S.E.R., three miles. *Opened*, 1896.

Situation: In the Wicklow Hills, three miles from the sea, on the southern slope of a hill. A mile or two to the south-west is a chain of hills from 660 to 820 feet high. Prevailing winds, north-west and south-west. Nearest town, Newtown, Mount Kennedy.

Soil: Gravel over granite. *Altitude*: 270 feet. *Grounds*: 28 acres.

Buildings: An administrative block connected by glass shelters with two other blocks for men and women respectively; and two other wooden buildings. The former have each three floors, two with covered balconies on the south side; twenty-four single-bedded rooms and two four-bedded. The other buildings also have deep verandahs. Ventilation by open windows: the plenum system having been abandoned. *Heating* by low-pressure steam. *Lighting* by electricity. Dining-hall to seat 100. Separate doctor's house in the grounds.

Terms: Letter of recommendation and 7s. per week. A few beds at 25s. (women) or 30s. (men). Patients recommended by Boards of Guardians: 21s. per week. Apply to Honorary Secretary: 13 South Frederick Street, Dublin.

¹ "Brit. Med. Journal," 5 April, 1913.

THE LARCH HILL SANATORIUM,

The Pine Forest, Rockbrook. *Station* : Dundrum.

Situation : In the mountains above Dublin, sheltered to the east and south-west by higher mountains rising to 1340-2000 feet, and in other directions by pine woods. There is an extensive view over five counties, including Dublin Bay, Dublin, Howth, and the distant Mourne Mountains. *Soil* : Gravel over granite. *Altitude* : 800 feet. *Grounds* : 80 acres, covering a steep slope rising from 700 feet to 1000 feet, including a trout stream, belts of pine trees, and walks of a variety of gradients.

Buildings : Consist of an administrative and residential block of two stories, a convalescent lodge, an isolation house and a number of chalets. There is a large dining-room. The kitchen department is shut off by a corridor and four doors from the patients' quarters in the residential block. These bedrooms face in two directions, and are well ventilated, though not arranged in a single line. *Windows* : large casements opening inwards, with large fanlight hinged above and opening outwards. Bedrooms finished and furnished in good sanatorium style, connected by electric bells with the doctor's and the nurses' room. *Cubic space* : 1600 cubic feet.

The chalets are very suitably constructed with verandah and interchangeable windows and shutters. *Heating* not provided. *Lighting* by oil lamps. There are numerous out-buildings, including an icehouse, dairy, laundry, surgery, disinfection-room, laboratory, engine-house, stable and destructor.

THE PEAMOUNT SANATORIUM,

Lucan, is *situated* on a hill well sheltered from north and east, eleven miles from Dublin, at an altitude of 300 feet above sea level.

There has been great opposition to it in the neighbourhood ; and there appears to be some doubt as to the available water supply.

THE CROOKSLING SANATORIUM,

Brittas, was founded by the co-operation of nearly all the sanitary authorities of the county and city of Dublin. It is *situated* in the open country on the western slope of the mountains about nine miles from the city. *Altitude* : 950 feet.

The *buildings* consist of a central administration block with two wings for patients, built of wood, plaster and corrugated iron. Electric *lighting*.

THE ALLAN A. RYAN HOME HOSPITAL FOR CONSUMPTION

is *situated* in two acres of ground in an open part of the suburbs of Dublin. It was managed until recently by the Women's National Health Association.

Buildings: Originally erected as an isolation hospital for the city of Dublin, but as they had been idle for some years they were converted by the Dublin Corporation to their present use at a cost of £700, and shelters put up in the grounds.

Terms: Free for city of Dublin patients. For those able to pay, 7s. to 15s. per week. For cases in the second or third stages. The founder (an American) has guaranteed an endowment of £1200 a year, for five years.

THE QUEEN'S COUNTY SANATORIUM,

Maryborough, was founded chiefly through the exertions of Lady Coote, and is *situated* in the grounds of Queen's County Infirmary.

The *buildings* are of timber with galvanized iron room and walls lined with felt and compo-boards. The building is raised above the ground from one foot to seven feet, owing to the slope of the ground. A large verandah with glazed roof runs the whole length, and under this at one end is a shelter. There are four single and two four-bedded wards. Large French windows, and fanlights over the doors.

The place was burnt down in November, 1912.

THE COUNTY CLARE SANATORIUM

was built at the cost of Lady Inchiquin and other subscribers. It is a small cottage sanatorium with acetylene *lighting*.

THE CORK COUNTY AND CITY SANATORIUM,

Heatherside, Streamhill, Doneraile, was the first county sanatorium opened in Ireland. It is *situated* three miles from Doneraile, on

the Ballyhoura range of hills, to the east of Ballywonear, in the open country. *Station* : Buttevant. *Altitude* : 450 feet. *Soil* : Sandy. *Grounds* : 130 acres.

Buildings : A central portion for administration, with patients' quarters on either side. Buildings of wood on cement foundation, with iron supports. Wards in single row. Eight are single-bedded. The largest number of beds in one ward is nine. *Heating* by steam pipes. *Lighting* by electricity.

Terms : Free to every patient in an early stage ; but preference is given to those from Cork County, and to the poor. Paying patients from Cork pay 15s. per week ; those from outside 21s. per week, or if sent by a recognized Charitable Society, 20s. per week. *Apply to* the Secretary, Court House, Cork.

Staff : Twenty-three resident, including matron, five nurses, ten maids, six men, and the resident medical superintendent, Dr. Richard Aherne.

SECTION VI.—THE BRITISH COLONIES.

CHAPTER XLV.

AUSTRALIA AND NEW ZEALAND.

THE following section is largely based upon an article by Sir P. Sydney Jones in the "British Journal of Tuberculosis," January, 1910, as I have been unable to get more recent information in time for publication.

AUSTRALIA.

Name and Locality.	Opened.	Cases Admitted.	Beds.
VICTORIA—			
Greenvale San., Broadlands	1905	Early, m.	90
Amhurst San.	—	Early, w.	65
Daylsford San.	—	Early, w.	10
Castlemaine San.	—	Private	—
Rutherglen San.	—	Private	—
Invalid Home, Nepean Quar. Stat.	1904	Advanced	16
Home for advanced cases, Cheltenham	—	"	100
Austin Hosp., Heidelberg	1881	"	120
Melbourne Hosp., Melbourne	1846	"	—
Farm Colony	—	Convalescent	—
Sunbury San.	—	Lunatics	—
NEW SOUTH WALES—			
Queen Vic. Homes, King's Tableland	1903	Early, m.	54
" " Thirlmere	1898	Early, w.	54
Oberlin, Hazelbrook	1910	—	16
Dr. Sinclair's San., Wentworth Falls	—	Private	12
Private San., Blue Mountains	—	"	8
Home for Consumptives, Parramatta	—	Advanced	—
Liverpool Benevolent Asylum	—	"	(100)
Home for Cons., Waterfall	1906	Early and advanced men	200
SOUTH AUSTRALIA—			
James Brown San., Belair	1894	Early	50
Nunyarra San., "	1902	Private	28
Kalyra San., Kalyra	1904	Early	53
North Terrace Home	—	Advanced	50
WESTERN AUSTRALIA—			
Coolgardie San.	—	—	60
QUEENSLAND—			
Dalby San.	1876	Early	30
Roma Hosp.	1868	"	(35)
Diamantina Hosp. for Incurables	—	Advanced	—
TASMANIA—			
Newtown San.	—	—	—
Campbelltown San.	—	Private	6

NEW ZEALAND.

Name and Locality.	Opened.	Cases Admitted.	Beds.
Te Waikato San., Cambridge	1902	All	60
Canterbury San.	—	—	60
Working Colony, Karere	1907	Convalescent	12
Otaki San., Christchurch	1904	Private	18
Dunedin San., Flagstaff	1904	„	14

Victoria.

A Victorian Association for Prevention of Tuberculosis was founded in December, 1901.¹

There are Government Sanatoria at Greenvale² and Amherst, for early cases. Patients in advanced stages are received at the Cheltenham Home, the Austin Hospital for Incurables, and other hospitals and homes.

Several other sanatoria were projected a few years ago. Amongst these were one in the Castlemaine district,³ one at Rutherglen,⁴ to be formed out of the buildings of the Viticulture College, and one for tuberculous lunatics at Sunbury.⁵ I do not know whether these schemes were realized.

New South Wales.

An Association for Prevention of Tuberculosis was founded here in 1901. There are two sanatoria for early cases in this colony, at Thirlmere and King's Tableland. Advanced cases are received in the Liverpool Benevolent Asylum, which is not exclusively for consumptives, and in a Home at Waterfall.

THE QUEEN VICTORIA HOMES,

originally founded by private subscriptions, and maintained for some years by Captain Goodlet, were taken over by the Jubilee Committee to commemorate the Jubilee of Queen Victoria's accession. They now receive a Government grant proportional to the subscriptions.

¹ "Lancet," 18 Jan., 1902.

² "Tuberculosis," Nov., 1909; "Lancet," 14 Dec., 1911, p. 1103.

³ "Tuberculosis," Jan., 1904.

⁴ "Lancet," 25 June, 1904.

⁵ "Brit. Med. Journal," 20 Dec., 1902.

THE WENTWORTH FALLS SANATORIUM,

King's Tableland, is in the Blue Mountains, sixty-two miles from Sydney, in a forest of eucalyptus and pine, 2800 feet above the sea level. *Grounds*: 960 acres, chiefly woodland.

Buildings: Are of wood on stone piers; they are lined with painted steel and roofed with red tiles, and face the north-east. The original house forms the administrative block, and contains nurses' quarters, dining-room, kitchen department, etc. On either side, forming the arc of a circle, are other buildings containing the wards, and connected behind by a corridor. There are six with six beds apiece, two with two beds, and two single-bedded; also twelve single shelters in front of the wards. Walls are painted and varnished. There is a separate cottage for the medical superintendent. Acetylene gas lighting. *Cubic space*: 1200 feet.

THE THIRLMERE SANATORIUM

is fifty-seven miles from Sydney, and stands 1000 feet above the sea level in 304 acres of land.

Buildings: Consist of a brick building constructed twenty-five years ago as an asylum for consumptives but recently modernized; of a doctor's cottage, nurses' quarters and rest-shelter, all of brick, and connected with the main building by a steel and concrete bridge (owing to difference of level), and of a few two-bed wooden chalets. The inner walls of the brick buildings are coated with enamel-painted cement, with rounded angles; there is acetylene gas lighting, drainage connected with septic tanks, and telephones between all the buildings. The aspect is north-east with good shelter to the south.

THE OBERLIN SANATORIUM

in the Blue Mountains, about fifty-five miles from Sydney, is intended for cultured but poor consumptives of both sexes, and was founded and endowed by the late R. T. Hall. *Grounds*: 150 acres, partly garden, partly woodland, with good protection to south and west. *Altitude*: 2210 feet.

Buildings are of brick on stone foundations. They consist of a

central administrative block with wards on either side and single-bedded wooden shelters. Windows are casements, pivot hung vertically, entirely removable at will, or of the "Austral" type, which consists of two panes which can be sloped vertically. A verandah runs the length of each building. *Lighting* is by electricity. *Cost* per bed, £250.

DR. SINCLAIR'S SANATORIUM,

at Wentworth Falls, near King's Tableland, commands a very extensive view over the country as far as Sydney, and is well sheltered at the back.

The *buildings* are of wood, roofed with galvanized iron, with a large space underneath for ventilation. They consist of a nurses' block and kitchen, five chalets and a long seven-chambered wing, opening in front on to a wide verandah supported on oblique stays instead of posts. There is an open-air dining-room at one end of the verandah. The bedrooms are lined with fireproof material, enamel painted, with pivot-hung or "Austral" windows, and hot- and cold-water supply.

THE HOME FOR CONSUMPTIVES

at Waterfall is on the south coast railway, twenty-four miles from Sydney. *Grounds*: 20 acres. *Altitude*: 1000 feet above sea level.

The *buildings* are of stone, and include six large wards, a large dining-room, and a number of small wards, scattered over about an acre of ground. There will eventually be 400 beds.

South Australia.

There are two public and one private sanatorium in this colony. There was a project for a sanatorium at North Terrace for advanced cases, in a disused lunatic asylum;¹ and an estate valued at £80,000 was presented to the Government for a sanatorium in 1904 by Mr. J. H. Angus, including 80 acres of land and buildings.² There are fifty beds for advanced cases in connexion with the Adelaide Hospital.

¹ "Brit. Med. Journ.," 26 Sept., 1903.

² "Tuberculosis," July, 1904.

KALYRA SANATORIUM

is a public institution, and consists of stone buildings. There are eleven free beds; the rest are for patients paying from twenty to forty shillings per week. *Medical Director*: Dr. Chas. Reissmann.

THE JAMES BROWN SANATORIUM

is on the Mount Lofty Range seven miles from Adelaide. The climate is stated to be an almost ideal one, being dry and bracing, enabling patients to live in comfort out of doors all the year round. In summer the temperature is several degrees below that of Adelaide, and is seldom oppressive. In winter the thermometer rarely falls below 45° F. *Altitude*: 1100 feet. *Grounds*: Over 30 acres, surrounded by much open country.

The *buildings* originally consisted of four blocks, a central one for the staff, one for male and one for female patients, and a large dining-hall (26 feet × 39 feet and 20 feet high), all connected with covered passages, and freely supplied with verandahs. New wings have since been added.

Charges: 15s. per week; the rest of the expense as well as the cost of the buildings (£8,000) being met by the legacy of the late James Brown. *Physician*: Dr. A. H. Gault.

NUNYARA SANATORIUM

is under the same medical direction as the James Brown Sanatorium. It is placed on the north side of a gentle slope with a well-wooded hill to the rear, which shelters it from the cold south-south-east and south-west winds in winter. The outlook is a magnificent one, giving a panoramic view of the Adelaide plains shut in on one side by the Mount Lofty Range, on the other by the Gulf. There is a large fruit garden, as well as woods of eucalyptus and pine. *Grounds* cover 60 acres. *Altitude*: 1041 feet. The *buildings* are of wood, with covered verandahs on the sunny side. Floors are polished, angles rounded, wooden furniture and woodwork enamelled white. Windows are large; a lavatory basin with hot and cold water is in each room; electric bells, and hot-water radiator. *Lighting* is by acetylene gas.

The dining-room and kitchen occupy a separate block. In the grounds are open-air galleries and shelters, some of which revolve.

Terms: Four guineas a week. *Physician:* Dr. A. H. Gault.

Queensland.

THE DALBY SANATORIUM,

or Jubilee Sanatorium, is on the open downs, in a piece of land of over 100 acres, with no trees within three miles. *Altitude:* 1115 feet. It is built on the pavilion system, each block connected with the next by a large circular verandah opening on to a grass courtyard.

Tasmania.

THE DIAMANTINA HOSPITAL FOR CHRONIC DISEASES,

Brisbane, has set aside a section for tuberculous patients. It consists of a number of open-air huts made of hard wood, with concrete floors and unlined galvanized iron roof, provided with a central ventilating shaft. The huts are entirely open on every side, but can be protected by canvas blinds on spring rollers. Each holds four beds and costs £80.¹

New Zealand.

There are public sanatoria at Cambridge in the North Island, and Canterbury in the South Island, both supported by Government; also private sanatoria at Christchurch and Dunedin. Others were planned at Otaki, Auckland, Hamilton, New Plymouth, Masterton, Nelson, Naseby, Laurence and Queenstown, mostly for about thirty beds.² Many of these may by this time be in working order. Advanced cases are received into six of the general hospitals.

THE TE WAIKATO SANATORIUM,

seven miles from Cambridge, is *situated* in the hills overlooking the Waikato plains, 1135 feet above sea level. *Grounds:* 1000 acres,

¹ "Brit. Journ. Tub.," Oct., 1909, Vol. III, No. 4: woodcut.

² "Brit. Med. Journ.," 12 March, 1904; 10 Sep., 1904. "Tuberculosis," July, 1904.

partly on the hills, partly level, a mixture of moorland, grassland, and woodland, including tree-ferns and cabbage-palms.

Buildings: A pre-existing half-timbered house used for administration, and three separate colonies of chalets, with from one to six beds apiece. One of these colonies is for women, the others being for men. Each has its own dining shelter, bathrooms, etc.; one has separate kitchen arrangements. The sanatorium is lit throughout with electricity. The sexes are not kept apart during recreation hours.

Staff: The management is in the hands of a medical superintendent who visits the place three times a week, and of a matron, with thirteen sisters and nurses.

Terms: One to three guineas a week. Some free beds.

KARERE WORKING COLONY

is intended for convalescents leaving the Cambridge Sanatorium. Although light work forms part of the routine of the latter, it is more systematically carried on in the Working Colony. This is *situated* in one of the tree-planting areas under the Government Forestry Department. The men are housed in large tents. There is a sister in charge, but the cooking, laundry, and other work is done by the inmates, who are paid by the Forestry Department for work done in tree planting.

Financial: Annual cost nearly £100, weekly cost per bed £1 18s. 1d. (1908).

THE FLAGSTAFF SANATORIUM,

near Dunedin, stands about 2000 feet above sea level, in 150 acres of ground. There are separate rooms for all patients, and glass verandahs and several day-rooms.

CHAPTER XLVI.

THE DOMINION OF CANADA.

AN Association for Prevention of Tuberculosis was founded in 1901. There are over seventy local societies in the various provinces, mostly affiliated to the Canadian Association. Many dispensaries have been opened in the various cities and towns, and much activity displayed in other ways.¹

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
NOVA SCOTIA—					
Provincial San., Kentville	1904	5	Dr. F. Miller	E.	30
QUEBEC—					
Lake Edward San.	1910	7-15	Dr. D. A. Craig	I.	25
Laurentian San., Ste Agathe des Monts	1911	8	Dr. J. R. Byers	I.	40
The Grace Dart Home, Montreal	1909	F.	—	A.	50
Brehmer Rest, Ste Agathe des Monts	1905	4, F.	Dr. A. J. Ricker	Predis. Conval.	15
ONTARIO—					
Muskoka Cottage San., Gravenhurst	1897	12-15	Dr. W. B. Kendall	E., M.	105
Muskoka Free Hosp. for Cons., Gravenhurst	1902	F.	„	E.	150
Toronto Free Hosp. for Cons.	1904	F.	Dr. W. J. Dobbie	A.	115
Mountain San., Hamilton	1905	up to 10 or F.	Dr. J. H. Holbrook	I., M.	60 ²
Southern Home for Adv. Cases, Hamilton	—	—	Dr. W. F. Langrill	A.	24
King Edward San., Toronto	1907	15-18	—	A.	40
Heather Club Pav., Toronto	1909	F.	—	c.	14
The Minnewaska San., Gravenhurst	1909	10-18	Dr. C. D. Parfill	I., M.	25
St. Catherine's Cons. San.	1909	F.	—	All	20
Queen Alexandra San., London	1910	0.50-1.50 per day	Dr. C. S. Mahood	I., M.	50

¹ "Tuberculosis Directory," compiled for the National Association for Study and Prevention of Tuberculosis, New York, 1911.

J. H. Elliott, "Brit. Journ. Tub.," April, 1910.

² Twenty free beds.

Name and Locality.	Opened.	Terms in \$ per Week.	Medical Officers.	Cases Ad- mitted.	Beds.
ONTARIO <i>cont.</i> —					
The Lady Grey Hosp., Ottawa	1910	F.	Dr. J. K. M. Gordon	A.	45
Sir Oliver Mowat Mem. Hosp., Kingston	1910	—	—	—	25
MANITOBA—					
Winnipeg Gen. Hosp.	1908	F.	Dr. Fred Bell	M. A.	25
Manitoba San. for Cons., Ninette	1910	12, F.	Dr. D. A. Stewart	E.	60
BRITISH COLUMBIA—					
King Edward San., Tran- quille	1908	15-18, F.	Dr. C. H. Vrooman	I.	50
Riverside Cott., Kamloops	1909	—	Dr. R. W. Irving	I., M.	15

For contractions, see p. 187.

Nova Scotia.

THE PROVINCIAL SANATORIUM,

Kentville, is *situated* on a bluff 250 feet above sea level, open to the south and south-west. It is of two stories, with circular projections at the corners on the south sides, and balconies and verandahs between, which can be closed by glass screens. The corner towers are used as solaria.

Quebec.

THE LAURENTIAN SANATORIUM

was erected by the Laurentian Society at a cost of about \$120,000. It consists of a large central mass connected by covered passages with smaller buildings.¹

Ontario.

THE MUSKOKA COTTAGE SANATORIUM,

erected by the National Sanatorium Association of Canada, is *situated* on the shores of Lake Muskoka, 125 miles north of Toronto, about 244 metres above the sea level, and is protected to the north and west by rocky hills and by a neighbouring wood of deciduous and coniferous trees. The *soil* consists of Laurentian rock; the climate is dry, bracing and free from dust.

¹ "Brit. Journal of Tuberculosis," April, 1910 (view).

The *buildings* consist of an administrative block and a number of cottages and shacks. The former has a central tower and diverging wings. It contains bedrooms for twenty patients, and reception rooms, and has a deep verandah in front of the ground floor, which forms three chief solaria, facing respectively south, south-east, and south-west, and can be enclosed with glass screens. Over the verandah is an open balcony.

The cottages contain each from four to six bedrooms and a large sitting-room with an open fireplace and are finished in hard wood, in the style of the Adirondack Cottage Sanatorium (p. 127). Every building has a southerly aspect, and is *lit* by electricity; all the beds are in separate rooms. *Heating* is by steam pipes. A laboratory has been established at the sanatorium by the provincial government.

THE MUSKOKA FREE HOSPITAL FOR CONSUMPTIVES

was also erected by the National Sanatorium Association on condition that the town paid at the rate of forty cents a head a day for the treatment of patients sent there. A site of fifty-six acres was presented by W. J. Gage, of Toronto, together with the trustees of the late Hart A. Massey. The Grand Trunk Railway Company grants free transit to 100 patients per annum, and charges half-fares beyond this number. A research laboratory was given by W. E. H. Massey, Esq.

There are two large three-story wooden buildings with balconies; the wards (mainly occupied by women) contain four to eight beds apiece, and are *heated* by steam, and *lit* by electricity. Most of the men sleep in shacks. Light work is part of the daily routine in all suitable cases.

REFERENCES.—

- See Knopf, "Pulmonary Tuberculosis," Philadelphia, 1899.
 "Zeitsch. f. Tuberk.," July, 1901.
 "Lancet," 19 May, 1900; 5 Jan., 1901; 23 Feb., 1901; 14 Nov., 1903.
 "British Medical Journal," 2 Jan., 1904; 9 April, 1904.
 "Lancet," 1 Oct., 1910 (views).
 "Brit. Journal of Tuberculosis," April, 1910 (views).

THE TORONTO HOSPITAL FOR CONSUMPTION

consists of an unpretentious two-story administration block and another, as well as wooden shacks for the patients. It stands in forty acres of ground near the edge of a small ravine, on the shore of the lake. The arrangements are simple but adequate.

REFERENCES.—

Broadbent, "Brit. Med. Journ.," 9 Feb., 1907 (views).

"Brit. Journ. Tuberculosis," April, 1910 (views); *ibid.*, April, 1908.

"Lancet," 17 Dec., 1910.

CHAPTER XLVII.

AFRICA AND INDIA.

Egypt.

SEVERAL hotels exist in various parts of Egypt with resident medical officers, and almost entitled to be called sanatoria. They are, however, by no means exclusively devoted to consumptives, and the climate and arrangements do not appear to be suitable for open-air treatment. Among the best-known hotels which might safely be visited are two at Helouan; Mena House, near the Pyramids; three at Luxor; and one which was specially built for a sanatorium at Assouan.

AL HAYAT SANATORIUM,

Helouan, was built with the financial assistance of Baron Knoop, and managed by two German medical men, one of whom (Dr. F. Plehn) has written a description in "Zeitsch. f. Tuberk.," October, 1903. Land was bought at the edge of the limestone plateau of Mokattam, about equally divided between this and the sloping sandy ground which runs towards the Nile. To the north is a deep wadi which is flooded once or twice a year; to the east is the desert plateau extending to the Red Sea. The sanatorium consists of three- to five-story buildings partially enclosing a large rectangular garden. The place appears to be most luxuriously finished, with marble pillars, rounded angles, roll-up blinds and ventilating fans just under the roof, mosaic floors, enamel-painted walls, etc. In the west wing are consulting-rooms, laboratory, gymnasium, and quarters for second medical officer and laboratory attendants. The kitchen and dining-room are in the east wing, which is connected by a glazed corridor with the top of the cliff, where there is a fine view over the town and the Nile Valley and Pyramids. All the

patients' rooms have a southerly aspect. In very hot weather they can be ventilated through the corridor from the north. Sick and healthy alike are admitted; the uppermost floor being intended for declared consumptives. Cases of nephritis, gout, rheumatism, arthritis and tropical complaints are all received. There is a separate hospital for infectious cases. There is a special verandah for brushing clothes on each floor.

The engine-house, disinfector and laundry are in another building.¹ The place was opened in December, 1903, and has eighty beds.

THE TEWFIK PALACE HOTEL,

at Helouan, stands about 140 feet above the Valley of the Nile, in the highest part of the town, which is three miles from the river. Helouan is half an hour by rail from Cairo.

THE CATARACT HOTEL,

at Assouan, is built in horse-shoe shape, with the convexity looking west. It is said to be specially planned with a view to the requirements of invalids, and to be well sheltered against prevailing winds. An English housekeeper is in charge of the domestic arrangements. Further information may be obtained from a little book on Assouan by W. E. Kingsford (Simpkin, Marshall & Co.).

South Africa.

Owing to the Boer War the arrangements for the treatment of consumption have been left in abeyance. Apart from hotels and farm-houses near the Karroo and elsewhere, I believe there are no sanatoria, although there are branches of the British National Association for Prevention of Consumption in Cape Colony and Natal.

India.

A home for consumptives was opened in 1902 at Hazaribagh in connexion with the Women's Friendly Society of Calcutta.

Hazaribagh is 600 metres above sea level on the Chota Nagpur plateau, the highest ground near Calcutta. It has a dry climate;

¹ "Zeitsch. f. Tuberk.," Oct., 1903. "Lancet," 26 March, 1904.

the heat is never exhausting, and in winter the place is distinctly bracing. The surrounding district is said to resemble the Transvaal and Orange River Colony.¹ The home is at present only for women and children.

The Indian Consumptives' Homes Society of Bombay opened a tent colony in June, 1909, in the Kadam pine forest at Dharampur in the Simla hills, not far from the railway. After a year these tents were replaced by wooden cottages. A nominal quit rent of five rupees is paid to the Maharajah of Patiala. Superintendent, Mr. A. C. Majundar; Hon. Physician, Dr. Banerji of Allahabad.²

KING EDWARD VII MEMORIAL SANATORIUM.

This has been founded by a society at Allahabad. It consists of buildings for forty-four patients (three Europeans) and tents for an additional twenty or thirty.³

THE KING GEORGE ANTITUBERCULOSIS LEAGUE OF BOMBAY

has opened a sanatorium at Karla for Hindoos. There is accommodation for those able to pay a small sum, and for those unable to pay anything.⁴

¹ "Lancet," 6 Oct., 1902; 26 Dec., 1903.

² "Brit. Med. Journal," 24 Sept., 1910.

³ "Lancet," 2 Nov., 1912.

⁴ "Brit. Med. Journal," 8 June, 1912.

SECTION VII.—DENMARK, NORWAY AND SWEDEN.

CHAPTER XLVIII.

DENMARK.

THE arrangements for combating tuberculosis are remarkably complete in this country.

There are altogether eighteen sanatoria, including two in the Färoe Islands and in Iceland, with between 1300 and 1400 beds. Three of these (with 130 beds) are for the middle classes, the largest having ninety-three beds. Six, with altogether 600 beds, were established by the National Association for Combating Tuberculosis, in addition to the children's sanatorium, which has 128 beds. The fees in these popular sanatoria for adults are uniformly 3 kr. per day. By the Antituberculosis Law of 1905, however, the State pays three-fourths of the sanatorium fees for any person of small means, leaving one-fourth to be paid either by the patient or by a Sick Benefit Club or Parish or other authority. There are also twenty-four hospitals¹ which collectively provide 755 beds for consumptives with more advanced disease. There is a uniform charge in them of 2½ kr. per day; but the State pays three-fourths in the case of those without means. Most of these hospitals belong to Municipalities. In addition to these, there are nine seaside sanatoria or hospitals for scrofulous children, two (with 230 beds) fully equipped, the others (with 380 beds) more like our Convalescent Homes. The charge in the first group is 2 kr. per day, in the others 1·20; but here also the State pays three-fourths if necessary. There are also a number of Tuberculosis Dispensaries in the various towns.

Two more seaside sanatoria for scrofulous children are being

¹ According to Oestergaard ("Centralblatt f. d. Ges. Tuberkulose Forschung," 30 Nov., 1912), thirty-two of these are in existence.

built; one of these will have thirty beds, the other (for graver cases of surgical tuberculosis) 100 beds.

Examination of sputa for tubercle bacilli is done free of cost in Denmark. Teachers who have pulmonary tuberculosis, or public functionaries in State employment or that of a Commune, are compelled to resign, but get two-thirds of the expense of treatment.

Many of the sanatoria in Denmark have had the land given them free of cost.

DANISH SANATORIA.

Name and Locality.	Opened.	Terms in kr. ¹ per day.	Medical Officers.	Class.	Age and Sex.	Beds.
Vejlefjord San.	1900	6½-8	Dr. Saugman	M.	m., w.	93
„ foreigners	—	9½	—	—	—	—
Helsebod San., Fyen	1901	2-2½	(Dr. Seidelin)	W.	m.	2
					w.	16
Boserup San., Roskilde	1901	3	Dr. Strandgaard	W.	m.	84
					w.	68
Solbad San., Holte	1901	4½-6	(Dr. de Fine Licht)	—	m., w., ch.	18
Silkeborg San.	1903	0·75	Dr. S. Bang ²	W.	m.	173
Ry San.	1903	3	(Dr. Isager)	W.	w.	38
Haslev San.	1903	3	(Dr. Chr. Götzsche)	W.	w.	24
Prof. Bang's San., Silke- borg	1905	5-6	(Dr. S. Bang)	M.	m., w.	19
Krabbesholm San., Skire	1905	3	Dr. Ivar Petersen	W.	m.	51
					w.	63
Skörping San.	1906	3	Dr. J. Stein	W.	w.	123
St. Joseph's Sisters San., Spangsbjerg	1908	3	Dr. Brinch	W.	m.	30
					w.	46
Nakkeböllefjord San., Pejrup	1908	0·75	Dr. O. Helms	W.	w.	122
Faxinge San., Praestö	1908	3	Dr. J. Ostenfeld	W.	m.	120
Julemarke San., Kolding	1911	2·50	Dr. Th. Oldenburg	W.	ch.	128
Rönne San.	—	—	—	—	—	—
Bornholm San., Rönne	1908	0·65-3·0	Dr. Kaaber	W.	m., w.	36
Thorshavn San., Färoe Is.	1908	2·50-3·0	Dr. Niels E. Jensen	All	m., w., ch.	32
		1·66-2·50				
Vifilstadir San., Iceland	1910	—	Dr. Sig. Magnusson	—	m., w.	80

Contractions: M. = middle class; W. = working class; m. = men; w. = women; ch. = children.

DANISH CONSUMPTION HOSPITALS.

Thisted	Beds. 18
Hobro	26
Oebeltoft	26
Esbjerg (St. Joseph's Sisterhood)	20

¹ One krone is worth about 1s. 1½d. English money.

² Recently resigned. Successor not yet appointed.

	Beds.
Assens	20
Odense	26
Holbaek	27
Lyngby	27
Rønne (connected with the San.)	26
Hjørring	22
Nyköbing (Mors, Jutland)	8
Aalborg (The Camillians)	15
Holstebro	26
Ribe	20
Horsens	18
Hornsylt	12
Give	16
Kolding	24
Svendborg	36
Roskilde	12
Frederiksberg (Copenhagen)	38
Gesundshosp „	282
Faxe	7
Finsens Institute (tuberculosis ward)	9

DANISH SEASIDE SANATORIA AND HOSPITALS FOR SCROFULOUS CHILDREN.

A. Fully equipped, with a resident medical staff: charges 2 kr. per day.

1. Refsnaes Coast Hospital, opened 1875 ; 130 beds. Medical superintendent, Dr. R. Hertz. *Situation* near Kallundborg in Zealand.

2. Juelsminde Coast Hospital opened 1900 ; 100 beds. On the east coast of Jutland. Medical superintendent, Dr. Hoff Hansen.

B. Seaside sanatoria or homes less completely equipped, without resident medical officers : charges 1·20.

	Beds.
1. Odder (Jutland) opened 1900	20
2. Bakkely, Refsnaes	20
3. Frederiksberg Seaside Colony near Copenhagen	130 ¹
4. Munkerup (Zealand)	80 ²
5. Helleboek (Zealand) opened 1906	70 ²
6. Faxe Ladeplads (Zealand)	30
7. Kalø Vig	30
8. Nyborg (Danish Fyen) being built	30

¹ Summer only.

² Open 300 days each year.

COST OF DANISH SANATORIA.

Name of Institution.	Beds.	Cost of Erection.			Cost of Maintenance.	
		With Land.	Land only.	Per Bed.	Per Head.	Food only.
Vejlefjord San.	93	£45,755	—	£492 ¹	—	2s. 8½d.
Helsebod	18	3090	£607	138	9s. 5d.	1s. 6d.
Boserup	152	36,000	free	240	3s. 4½d.	1s. 8d.
Silkeborg	173	27,118	free	157	3s. 2d.	1s. 5d.
Prof. Bang's	19	—	free	148	6s. 2½d.	2s. 9½d.
Ry	38	6175	£281	155	2s. 10d.	1s. 1d.
Haslev	24	3443	free	144	3s. 11d.	10d.
Krabbesholm	114	24,652	£1688	201	3s. 8½d.	1s. 4d.
Skörping	123	28,125	free	229	2s. 7d.	1s. 1½d.
St. Joseph's	76	28,125	£394	365	3s. 4½d.	1s. 3d.
Nakkebüllefjord	122	35,437	1012	262	2s. 8d.	11d.
Faxinge	120	35,634	—	297 ¹	2s. 10d.	1s. 4d.
Julemarke	128	57,937	2250	435	3s. 0d.	10d.

In this table the krone is reckoned at 1s. 1½d.

VEJLEFJORD SANATORIUM

is *situated* on the north side of the Vejlefjord, a branch of the Kattegat, about 80 feet above the sea level and 1000 from the shore. *Grounds*: 115 acres, wooded with beeches, firs and oaks, most systematically laid out with graduated walks, so that there are some seventy of these divided into seven classes, varying from level to one in eight. A small pier serves the place, which is sheltered by wooded hills to the west, north, and east.

Buildings: A main block, engine-house, and separate villas for the manager and the medical director and first medical assistant. The main block is a three-story brick building with a straight front and slight central and lateral projections. The basement contains kitchen and hydropathic installation. The ground floor is mainly occupied by day rooms, the dining-room being in the eastern wing, near the consulting rooms. The western wing is set aside for those requiring special nursing, and has a verandah in front of it, divided off by movable partitions, the roof of the verandah reaching part way up the windows. There are casement windows with fanlights; electric fans and ventilating shafts for the public rooms. Seventeen bed-

¹ Including land.

rooms are double-bedded, the rest being single. Electric *lighting*; *heating* by steam or hot water. The chief rest-shelter is double, with a north and south aspect, and forms a curve at the eastern end of the main block. There is another in the woods.

Staff: Three doctors and a dispenser.

Financial: Although this is a private sanatorium, there is a State subvention of £900 per annum. After expenses, depreciation, and 4 per cent on capital have been paid, the profits go to lower charges.

Statistics: In 1912, 128 patients were admitted.

Average length of stay: 113 days.

REFERENCES.—

"Tuberculosis," Oct., 1902.

C. T. Williams, "Tuberculosis" (London), April, 1904.

"Zeitsch. f. Tuberk.," i. 2, p. 167.

HELSEBOD SANATORIUM,

Hjalsoe, Fyen, near Odense, belongs to the Danish Deaconesses Institution. *Altitude*: About 25 feet. *Soil*: Black fertile forest soil. *Grounds*: About 4 acres.

The *building* is a two-story one, with two single-bedded rooms, the rest being wards with not more than three beds apiece. There are two ventilators in addition to open windows. *Heating* by hot air. *Lighting* by electricity.

Staff: One doctor and three nurses.

Patients admitted in 1911: Thirty-four.

Average stay: 194 days.

BOSERUP SANATORIUM.

Situation: Erected by the communes of Copenhagen in well-wooded ground near Roskilde in the island of Zealand, three-quarters of an hour by rail from the city. *Altitude*: 13 metres. *Soil*: Sandy. *Grounds*: 53 hectares.

Buildings: There are two three-storied stone buildings, one for men, the other for women and for the medical director. The kitchens, offices, bathrooms and machinery are in the basement, with rest-galleries in front where the ground falls. The wards (for

one, two or six beds each) are on the first and second floors, mostly on the south side, some having recessed covered balconies. *Cubic space*: 990 cubic feet. *Heating* by hot-water radiators. *Lighting* by electricity.

Administration: By the medical director, assisted by the inspector of the neighbouring lunatic asylum.

Staff: Three medical officers, matron, four nurses, housekeeper, laundress, seven male and twenty-seven female servants.

Statistics: In 1911, 303 patients were discharged. *Average length of stay*: 169 days. *Average gain in weight*: 5·1 kgr.

REFERENCE.—C. T. Williams, "Tuberculosis" (London), April and May, 1904.

SOLBAD SANATORIUM,

Holte St., is in private ownership, and is *situated* about eight miles from Copenhagen, surrounded by woodland. *Grounds*: 5½ acres. *Altitude*: 185 feet.

Buildings: A country house to which additions have been made. Rooms mostly single-bedded, a few having two beds each. *Heating* is by stoves. *Lighting* by electricity.

Staff: A consulting physician, physician, housekeeper, nurse, and five servants, under the owner.

Patients admitted in 1912: Forty-seven. *Average stay*: Three to six months.

SILKEBORG PUBLIC SANATORIUM,

erected by the National Association for Combating Tuberculosis.

Situation: In Jutland, about a mile from the town of Silkeborg. Slightly raised above the surrounding wooded country, it has but little shelter from the north, beyond that of some trees. The sanatorium commands a view of a river, wooded hills and lakes. *Soil*: Sandy gravel. *Altitude*: 26 metres. *Grounds*: 20 hectares, with the use of 30 more belonging to the State Forest. The site, water supply, and private road were a gift from the town of Silkeborg.

Buildings: A main block of three stories, a separate administration block behind it, medical officer's villa commanding the south side of the patients' quarters, and separate engine-house with laundry. The main block has a straight south front, with wings and centre

projecting northwards. On either side are rest-shelters forming a curve, with asphalted roofs on which turf is placed in summer. The centre of the ground floor forms a day room, with a large dining-hall to the east, and single-bedded wards to the west. In the western wing are consulting and nurses' rooms, laboratory and lavatories. The kitchen department is in the eastern wing.

The remaining wards, containing from two to six beds apiece (mostly three), are on the upper floors, the greater number having a south aspect. The windows are large; the doors have the upper half as a removable window. *Cubic space*: 990 cubic feet. The single-bedded south rooms have small separate balconies. The kitchen department, with cooking by steam or gas, is in the basement; also general bathrooms. The ward lavatory basins and lockers for clothes are in the adjacent corridors. *Heating* by steam pipes. *Lighting* by electricity.

Staff: Three physicians, a chemist, five nurses, a housekeeper, an engineer, and thirty-five assistants and servants.

Statistics: In 1911, 416 patients were admitted and discharged. Average length of stay: 151 days. Average gain in weight: 5.2 kgr.

REFERENCE.—

"Tuberculosis," Feb., 1904.

C. T. Williams, "Tuberculosis" (London), April, 1904.

PROF. BANG'S PRIVATE SANATORIUM,

Silkeborg, is *situated* near the public one, in 3 hectares of ground. The rooms are all single-bedded. Central hot-water *heating*; electric *lighting*.

Staff: The medical director of the public sanatorium, a lady manager, two nurses and eight servants.

Patients admitted in 1911: Nineteen. *Average length of stay*: 170 days.

RY SANATORIUM,

like the Silkeborg Sanatorium, was built by the National Association for Prevention of Consumption, in a young pinewood about twenty kilometres to the east of the men's sanatorium. *Grounds*: 10 hectares. *Soil*: Sandy. *Altitude*: 40 metres.

The *building* is of two stories, and has the kitchen department with heating, bathing, and disinfecting apparatus in the basement; day rooms, consulting rooms, laboratory, nurses' rooms and two single-bedded rooms on the ground floor; wards for four to six beds apiece on the upper floor.

The lavatory basins and clothes lockers are placed in the corridor. *Heating* is by hot-water pipes; *lighting* by gas (Benoit's system), also employed for some of the cooking. The rest-shelter is separate from the house. There is another building for the disinfecter and staff quarters. The medical officer comes out twice or thrice daily from the neighbouring village, the management being entrusted to a matron.

Patients admitted in 1911: Eighty. *Average stay*: 150 days.

REFERENCE.—"Tuberculosis," Vol. III, No. 2 (Feb., 1904).

THE HASLEV PUBLIC SANATORIUM,

erected by the National Association, is *situated* in a beech wood about an hour's journey from Copenhagen. *Soil*: Loamy. *Altitude*: 37 metres. The *grounds* were given for the purpose.

Building: A two-story building with central projection. The wards contain up to eight beds apiece. There is central hot-water *heating*, and *lighting* by gas. Only women in the first stages are admitted.

Staff: A medical officer, two nurses, and six servants. *Patients admitted* in 1912: Sixty-two. *Average stay*: 140 days.

REFERENCE.—"Tuberculosis," July, 1904.

THE KRABBESHOLM SANATORIUM

at Skive was opened by the Danish Co-operative Farmers' Association. The *soil* is sandy. *Altitude*: 15 metres. *Grounds*: 27 hectares, consisting of woods and gardens.

Buildings: Two stories with attics, containing two single-bedded rooms, the majority having from four to six apiece, the rest two to three. In a separate pavilion are twelve beds in two wards for women, in addition to the accommodation in the main building. Central *heating* by hot water. Electric *lighting*.

Staff: Nominally two doctors, but for the last two years only one. *Patients admitted* in 1912: 230. *Average stay*: 126 days.

THE SKÖRPING PUBLIC SANATORIUM

belongs to the National Association for Combating Consumption. *Situated* about three miles from the town of Skörping.

The *building* has two stories and garrets. The wards contain not more than six beds each. *Heating* is by warm-water pipes. *Lighting* by electricity.

Staff: Two doctors, one pharmacist, one sister and three nurses, manager, clerk, eleven men-servants, and seventeen maids.

Patients admitted in 1912: 295. *Average stay*: 160 days.

Intended for women without private means.

THE ST. JOSEPH'S SISTERHOOD SANATORIUM,

Spangsbjerg, near Esbjerg, belongs to the Sisters of St. Joseph, of Chambéry in Savoy.

It is *situated* in a pinewood two kilometres from the North Sea, from which it is separated by meadows. *Soil*: Sandy. *Altitude*: 25 metres. *Grounds*: 15 hectares.

Buildings: A principal building, in which the men occupy the ground floor, the women the two upper floors; and a separate pavilion for those more seriously ill, in which the men occupy one end of a single story building, the women the other end. Two single-bedded rooms, the largest number being six beds in a ward. Large windows in four pieces, the upper consisting of a large fanlight, the lower of a sash window. Electric *lighting*. *Heating* by hot-water pipes.

Staff: A medical director, sister superior and eight other sisters, besides electrician and servants. *Patients admitted* in 1912: 250. *Average stay*: 150 days.

THE NAKKEBÖLLEFJORD SANATORIUM,

at Pejrup near Faaborg, was built by the National Association. The *grounds* are of 11 hectares, mostly wooded with large beech-trees. *Soil*: Sandy. *Altitude*: 10 metres.

The *building* is a long one of two stories with attics. The dining-room with vestibule and five two-bedded wards are on the ground floor. There is also a day room with large windows and door leading on to the terrace. On the upper floors the wards contain respectively six, four or two beds each. Central hot-water *heating*. Electric *lighting*. The rest-shelter lies to the west of the building. There is a separate villa for the chief medical officer.

Staff: Three medical officers, matron and three nurses, store-keeper, clerk, two engineers, two stokers, nineteen women servants and three other men.

Patients admitted in 1912: 283. *Average stay*: 166 days.

THE FAXINGE SANATORIUM,

erected by the National Association at Praestö in about 35 hectares of ground, consists of a large three-story *building* with attics, with a northerly central projection in which is situated the dining-room on the ground floor. There is also a fine day room. The wards contain not more than six beds apiece. Four are single-bedded. Electric *lighting*. *Heating* by hot-water pipes. There is a separate villa for the chief medical officer.

Staff: Two doctors, pharmacist, and four nurses.

Patients admitted in 1912: 237. *Average stay*: Six and a quarter months.

THE BORNHOLM SANATORIUM,

at Rønne in the island of Bornholm, is partly hospital, partly sanatorium. It is on sandy *soil*, surrounded by woods of pine, fir and birch, on State land. *Altitude*: 20 metres above sea level.

Buildings: A one-story sanatorium portion for ten patients (men and women), and a two-story hospital building, connected by a rest-shelter. There are two single-bedded rooms, the maximum number of beds in a ward being five. *Heating* is by hot-water pipes. *Lighting* by gas. Ventilation by two sets of hinged window-panes, and by ventilating shafts.

Staff: One physician, three nurses, steward and eight servants.

Cost of erection: 115,000 kr.

Patients admitted in 1912: Thirty-five. *Average stay*: 230 days.

THE JULEMARKE SANATORIUM FOR CHILDREN,

at Kolding, was erected by the National Association out of the proceeds of special Christmas stamps issued for the purpose. It is *situated* in a small sheltered valley, sloping down to the sea, and protected by pine woods. The *grounds*, of 24 hectares, consist partly of woodland, partly of gardens and fields. *Soil*: Clay mixed with sand and alluvium. *Altitude*: 56 Danish feet above sea-level.

The *building* is of three stories with attics. The heating apparatus is in the cellars, the dining-room in the basement next the kitchen department on one side and the baths and douches on the other. In the centre of the ground floor is a large day room for boys and girls alike. Elsewhere the sexes are separated. There are balconies on each floor, in the centre and at the ends, recessed into the building. There are six wards with eighteen beds apiece, one with six, two with five, two with two. Under the roof is an operating theatre with modern equipment, and a school-room which is used two or three times a day. Subsidiary buildings are placed to the north, surrounding a sort of quadrangle. One of these buildings is for the laundry. There is also a separate isolation block with twenty beds (seven rooms with two, two rooms with three beds each). Children are kept here for a fortnight after admission, to make sure of the absence of infectious fevers. The chief medical officer has a separate villa. *Heating* is by hot-water pipes; *lighting* by electricity. The rest-shelters form a curve below the level of the terrace. There is a bathing-place in the sea opposite the building.

Staff: Three medical officers, matron with four nurses and six probationers, a governess, engineer, inspector, twenty-three maids and four men and four other assistants.

Patients received: From August, 1911 till end of 1912, 300 children. *Average stay* about six months.

THE FAROE COUNTY INFIRMARY FOR CONSUMPTIVES,

Thorshavn, is *situated* close to the sea in a low-lying kettle-shaped valley amongst the hills, surrounded by rocks and moorland. *Soil*: Peat over rock. *Altitude*: 20 feet. *Grounds*: 8 acres.

Buildings: There is a hospital section and a sanatorium section.

The main building is of three stories, of wood on stone foundations, with a peat-sod roof. The hospital section is uppermost, the sanatorium patients being on the first floor, and the heating apparatus, kitchen and laundry on the ground floor. Men occupy one end of the building, women and children the other, with a separation between. There are two single-bedded rooms. Maximum number of beds in a ward, four. Ventilation by open windows and special air shafts leading to the roof. *Heating* by low-pressure steam pipes. *Lighting* by incandescent gas (Benoit system).

Financial: Cost of erection, £9111; land given free. Cost of maintenance per head per diem just over 3s., food 1s. 5d. *Terms* quoted in the table on p. 290 are for adults and children in the hospital and the sanatorium section respectively. For those unable to pay the whole the State pays three-fourths of the cost.

Staff: A physician, matron and nurse, steward, six maids, and engineer.

Patients admitted in 1912: Twenty-eight. *Average stay*: Eight months in the sanatorium section, twelve in the hospital section.

THE VIFILOSTADIR SANATORIUM,

near Reykjavik, in Iceland, was founded by a society which originated in the Oddfellows Lodge of that city. It consists of a three-story stone building with a small central northern projection and two larger lateral ones. The central projection contains the main staircase, W.C.'s and a few small rooms; the latter, subsidiary staircases and small wards, the larger wards being placed on the south side of the main corridor. The single-bedded wards are reserved for the less promising cases. The floors are covered with linoleum. There are large casement windows in four parts, the upper hinged above. Plain enamelled iron bedsteads, and simple furniture. Lavatory basins and clothes lockers are placed in the corridors. There is a large day room and a dining-room; the sexes are not separated in these rooms. There is central steam *heating* and electric *lighting*. A solidly built rest-gallery with small windows on the north side and an open south front projects beyond the western end of the building, on a level with the basement.

Cases are received in all stages of the disease.

Statistics : In the sixteen months ending 31 December, 1911, 179 patients were received, and 106 discharged. Of these twenty-three were in a hopeless state on admission, thirty-six in Turban's first stage, twenty-three in his second stage, nineteen in his third stage. *Average stay* : 186 days. Good results in 75·6 per cent.

CHAPTER XLIX.

NORWAY.

THERE is a complete organization in this country for dealing with tuberculosis. There are 333 local societies connected with the National Association for Prevention of Tuberculosis; and the State subvention amounts to about £7200 per annum.

In addition to a number of private and public sanatoria, it has been arranged to establish a large number of small homes or hospitals for advanced cases scattered throughout the country. These have an average of sixteen beds apiece, very few having over twenty. One at Trondhjem, in construction, will have sixty beds, one at Trigstad has forty, but the rest are quite small. It is expected that there will be about fifty ready by the end of this year, with a total of 800 beds; and including those which are planned there will be well over 1000 beds provided. The ones which are in operation are freely resorted to. In Finmark, where the tuberculosis mortality is heaviest, salaries have been offered by the National Association to the local doctors to enable them to study methods of treatment in sanatoria.

Four forest schools and holiday colonies have been established, at Maridalen, near Bergen, Christiania, and Trondhjem respectively. There are also two convalescent homes at Bergen for tuberculous adults and children respectively.

NORWEGIAN SANATORIA.

Name and Locality.	Opened.	Terms in Kr. ¹ per day.	Medical Officers.	Cases Ad- mitted.	Beds.
PUBLIC SANATORIA—					
Reknaes Folkesanatorium	1897	1'20 or F.	Dr. E. Kaurin	E.,m.,w.	70
Lyster "	1902	1'25	Dr. E. Grundt	E.,m.,w.	126
Saetersdalen "	in con.	—	—	—	120
Saltdalen "	"	—	—	—	100
PRIVATE SANATORIA—					
Gjösegaarden San.	1894	5-6	Dr. Fr. Jonassen	E.,m.,w.	32
Mesnaliën "	1900	5-8	Dr. W. Holmboe	E.,m.,w.	40
Grefsen New "	1900	3	Dr. J. Mjöen	E.,m.,w.	40
Kornhaug "	—	4½-5½	Dr. W. Holmboe	—	31
Granheim "	—	4-4½	Dr. L. Wiegaard	—	30
Graim Folkesan	—	2'75-3'50	Dr. A. Tillisch	—	120
Glittre "	—	3	Dr. J. Mjöen	—	44
Oevre Toft	—	3	Dr. P. Konow	—	15
CHILDREN'S SEASIDE HOSP.—					
Frederiksværn Hosp.	—	1	Dr. H. Sunat	c.	100
Hageviken "	—	1	Dr. H. Yade	c.	100
Saltbureau "	—	1	Dr. Ellen Seip	c.	20
Vadsö "	in con.	—	—	c.	30
SUMMER SANATORIA—					
Nor near Hamar	—	1'20	Dr. Hille	b., g.	12
Bjorkheim	—	1'25	—	b., g.	10

THE REKNAES SANATORIUM.

Originally a leprosy hospital, but converted into a sanatorium for the tuberculous.

Situation: Near Molde, on the north side of the Molde fjord. It is sheltered by mountains to the north and west, and has a milder climate and more luxurious vegetation than other parts of Norway. It is placed in a large garden overlooking the fjord.

Buildings: A wooden building of two stories, composed of a centre and two projecting wings, which between them enclose a courtyard, and are separated from the road in front by a long rest-shelter. Wards for two to four patients each. *Cubic space:* 140-150 cubic metres. Ten beds reserved for children. Both sexes are admitted.

Staff: A medical director, four nurses, ten servants.

¹ 1 Krone = 1s. 1½d.

THE LYSTER SANATORIUM,

supported by the funds of the St. Jørgens Leprosy Hospital at Bergen, and by a State subvention. Founded through the exertions of Dr. Klaus Hansen.

Situation : On the Sogne fjord in a sheltered situation 470 metres above sea level. The climate is very rainy, but mild and equable. *Grounds* : 80 hectares, partly hilly, reaching to the limits of woodland above.

Buildings : A three-story building planned like the Hohenhonnef Sanatorium. The ends of the building are thickened, but have only a single row of bedrooms, like the centre. The western wing is served by a corridor at right angles to the main one, so that the rooms there look south-west like those of the eastern wing. The administration, etc., is placed in a central pavilion projecting northwards, and in various isolated buildings. There are twenty-one wards with four beds apiece, and twelve single-bedded. *Cubic space* : 36 cubic metres per bed ; a lavatory in each floor in the wings ; rest-shelters in two tiers in front of the basement. *Lighting* by electricity. *Heating* by steam-pipes.

Financial : The cost is said to have been 1200 kr. per bed. Daily cost 3 kr., out of which the State pays 1·80 kr.

REFERENCE.—“Tuberculosis,” July, 1903.

GJÖSEGAARDEN SANATORIUM,

the first private sanatorium opened in Norway, is *situated* near Kongsvinger, close to the Swedish frontier, about three hours by rail from Christiania. It is surrounded by woodland. *Altitude* : 200 metres.

The *buildings* consist of a cluster of two-story wooden houses, with balconies and verandahs.

MESNALIEN SANATORIUM.

Situation : Eight miles east of Lillehammer, on the southern slope of the mountains between Gudbrandsdal and Osterdal, protected on the north and east by wooded heights, and on the west by forests of pine and birch, and surrounded by extensive forests. Extensive

views to the south and west over lakes and hills. *Elevation* : 1800 feet. *Station* : Lillehammer, two hours' drive from the sanatorium, five hours by rail from Christiania.

The *building* is of two stories, built of wood with non-absorbent walls and floor. The eastern end projects slightly southward, and has the dining-room on the first floor, the drawing- and billiard-rooms on the second floor. The north side of the building consists of staircases, consulting-room, surgery, offices and W.C.'s, with a few bedrooms for patients and servants. Most of the bedrooms, however, are on the south side. Verandahs and balconies are placed on three sides of the building. There is asbestos in the thickness of the walls to deaden sound. Electric *lighting*. Heating by low-pressure steam.

REFERENCES.—

"Brit. Journal of Tuberculosis," ii. 2, April, 1908.

"Lancet," 30 May, 1908.

KORNHAUG SANATORIUM.

Situation : In the Gausdal, within a drive from Lillehammer.

Buildings : A doctor's house with nine bedrooms for patients ; and a special building with room for twenty-nine more. The latter is of two stories, with a verandah along the basement on the south side. Heating is by low-pressure steam.

GRANHEIM SANATORIUM.

Situation : In the Gausdal in a pine-wood dominated by the mountains on three sides. Access by driving from Lillehammer. This sanatorium is frequented by the higher grade working class and the lower middle classes.

GREFSEN SANATORIUM.

Situation : Half a mile from Christiania on the southern slope of the pine-clad Grefsenberg. *Altitude* : 170 metres.

Buildings : Originally a hydropathic establishment, with six houses united by bridges, three looking south, three east and west, but considerably enlarged with the help of a grant from the Storting. The rooms have floors covered with linoleum, washable

wall-papers or painted compo-board for the walls, low-pressure steam *heating*, and acetylene *lighting*. For ventilation there is an inlet under the radiator and an outlet at floor and ceiling of each room. Most of the bedrooms are single-bedded. There is a large well-wooded park ; rest-shelters are placed on an eminence, a little higher than the sanatorium, reached by an easy curved path.

Staff: Dr. John Mjöen, two assistant medical officers and a dentist.

CHAPTER L.

SWEDEN.

THIS country was one of the first to organize a campaign against tuberculosis ; and these efforts have been much assisted by the liberality of the Royal family. Through the Queen's influence, the gift of 2,200,000 kronen to the late King Oscar II, to commemorate the jubilee of his accession to the throne, was devoted to the erection of three sanatoria for consumptives. The Riksdag have repeatedly voted additional sums of money for this purpose. Free building sites on the Crown forest domains, and annual grants of wood have been given, as well as 200,000 kr. per annum to form a sufficient endowment. In 1911 the State contributed 372,000 kr. towards the erection, and 225,000 kr. towards the maintenance, of institutions for the tuberculous.

There are now fifty-two sanatoria and chest hospitals in Sweden, with collectively 2715 beds. Eleven of these are private, with 352 beds.

There are now dispensaries in twenty-one of the chief towns of Sweden. A rural colony for advanced but relatively stationary pulmonary tuberculosis was started in Southern Sweden in 1911, and thirty men and women with their families have been settled there. Grancher's method of boarding out the children of tuberculous parents is also adopted. In 1911, 101 children were so boarded out.

In addition to much educational propaganda, the National League for the Prevention of Tuberculosis has inaugurated a course of training for certificated nurses in antituberculous work, and another for medical men in sanatorium treatment. For two years in succession twelve nurses have been sent to Stockholm free of expense for a course of lectures with practical demonstrations on personal and domestic hygiene, domestic economy, protection of

infancy, dispensary and sanatorium treatment, and charitable work, followed by a fortnight's training at the Social Hygienic Institute at Norrbotten. Every year since 1904 six scholarships have been given to medical students enabling them to spend two months at one or other of the Jubilee Sanatoria, taking part in the clinical work.

As regards children, there are three sanatoria on the coast with collectively 370 beds; and two more (with fifty-two beds) for the healthy children of tuberculous parents.

SWEDISH SANATORIA.

Name.	Postal Address.	Opened.	Cases Admitted.	Beds.
Haralds Minne	Alingsås	1887	w.	12
Sabbatsberg	Stockholm	1899	—	32
Hålahult	Hålahult	1900	—	124
Österåsen	Österås	1901	—	144
Hessleby	Mariannelund	1901	—	124
St. Göran	Stockholm	1902	—	146
University Hospital	Upsala	1903	—	44
Malmö hälsovårdsnämäs	Malmö	1903	—	30
Köpings tuberculosis pavilion	Köping	1903	—	6
Lund	Lund	—	—	16
Trollhättan Sanatorium	Trollhättan	1904	—	12
Sala tuberculosis pavilion	Sala	1904	—	7
Vattholma	Vattholma	1906	—	23
Landskrona tuberculosis pavilion	Landskrona	1906	—	18
Stratömta	Linköping	1907	—	30
Malmö allmänna	Malmö	1907	—	58
Blommenhof	Nyköping	1908	—	28
Kolbäck tuberculosis pavilion	Kolbäck	1908	—	16
Utanede	Edsele	1908	—	24
Fur	Saleboda	1909	—	47
Solliden	Östersund	1909	—	40
Söderby	Uttram, Stockholm	1910	—	452
Löwenströmska	Väsby	1910	—	70
Västra Lidhem	Växjö	1910	—	12
Gottlands	Visby	1910	—	25
Kungshult	Hälsingborg	1910	—	40
Sahlgrenska	Göteborg	1910	—	54
Karlstads Sanatorium	Karlstad	1910	—	21
Lindesbergs	Lindesberg	1910	—	25
Högbo	Falun	1910	—	67
Ludvika tuberculosis pavilion	Ludvika	1910	—	12
Jonas Selggrens Sanatorium	Gävle	1910	—	45
Sävstaås	Bollnäs	1910	—	18
Svenshögens Sanatorium	Svenshögen	1911	—	80
Kroppefjäll	Dals-Rostock	1911	—	51
Västerås Sanatorium	Västerås	1911	—	70
Folkarbo	Krylbo	1911	—	29

Name.	Postal Address.	Opened.	Cases Admitted.	Beds.
Kaptensgården	Malmberget	1911	—	27
Värmlands läns.	Arvika	1912	—	102
Broby Sanatorium	Broby	1913	—	100
Medelpad	Sundsvall	1913	—	80
PRIVATE SANATORIA FOR WORKMEN—				
Hamra	Tumba	1900	m.	32
Bälteberga	Tidaholm	1901	—	18
Hälsan	Mörsil	1901	—	14
Frederikskulle	Sandviken	1905	—	20
Mogetorp	Järle	1906	m.	15
Grängesbergs Sanatorium	Grängesberg	1907	—	16
Bergebo	Borlänge	1909	—	20
PRIVATE SANATORIA—				
Mörsil	Mörsil	1891	—	56
Sävsjö	Sävsjö	1907	—	81
Romanäs	Tranås	1907	—	60
Sundsholm	Skallinge	1907	—	20
COAST SANATORIA FOR CHILDREN—				
Crown Princess Victoria	Barkåkra	1903	—	180
Apelviken	Varberg	1904	—	112
Styrsö	Gothenburg	1908	—	78
SANATORIA FOR HEALTHY CHILDREN—				
Födelsedagen	Rävlanda	1907	—	27
Barnskyddet	Kungsör	1908	—	25

ÖSTERÅSEN SANATORIUM.

Situated in a wooded plateau above the confluence of two rivers in Norrland; this plateau is fringed by wooded ridges to the north and west. *Altitude*: 230 metres above sea level.

Buildings: The main structure consists of a central three-story portion on a brick basement, and four pavilions of one story, entirely of wood. The western pavilions are intended for men, the eastern for women. They are connected with the central block by corridors, somewhat in the shape of the letter X. The wards are entirely on the south side, with from one to six beds in each. The general wards have eighty beds, the semi-private wards twenty-four, the private rooms numbering eight. Floors are covered with linoleum, walls colour-washed; north of the corridors are lavatories, ward kitchens and nurses' rooms. The central portion has on the basement the offices, laboratory, baths, disinfecting rooms, etc.; above this are common rooms to the south and dining-rooms to the north; and behind these the kitchen quarters. On the next floor

are store-rooms and living-rooms. *Heating* by low-pressure steam. *Lighting* by electricity.

To the south of the building is a large rest-shelter with its back to the solid rock, and provided with heating-rooms at the ends for rugs and coverings in winter.

Financial: Cost of erection, 731,661 kronen; cost of equipment, 52,315 kr.; cost per bed, 7000 kr.

Admissions: About 290 per annum.

REFERENCES.—

Plans and Descriptions of Jubilee Sanatoria in "Tuberculosis," July, 1903.

Description by Dr. E. Wadstein of the Jubilee Sanatoria, "Brit. Journal of Tuberculosis," ii. 2, April, 1908.

HESSLEBY SANATORIUM.

Situated in the Hessleby Crown Forest Domain in Southern Sweden, well sheltered from the north and east by a wooded hill and from the west by forest. *Access*: two kilometres from the Mariannelund railway station.

Grounds: 750 hectares, mostly woodland. *Soil*: Gravel. *Altitude*: 240 metres above sea level.

The *building*, which is of stone with iron and concrete floors, consists of a central portion running north and south, with long wings projecting from the south and at an obtuse angle. Owing to the slope of the ground there are two stories to the north, three to the south.

The central portion has in the basement the manager's office, waiting- and consulting-rooms, X-ray-room, testing-room and laboratory. On the ground floor are two common rooms with a balcony to the south, beyond this a vestibule with book-shelves and a small dining-room; still farther north a fine dining-room capable of seating 130 persons. On the first floor are the quarters for the assistant medical officer and for the head nurse, an invalid's room for officers, and a room for the inspector.

The wings are occupied by workshops and store-rooms in the basement, by wards on the two upper floors. The wards are all on the south side of the corridor. There are eight private wards, twelve "semi-private," for two apiece, and two classes of general wards with each four beds. The floors are covered with linoleum.

Corners are rounded, walls colour-washed, windows are casements with large fanlights above, two ventilators being also placed on the wall opposite each window. *Heating* by low-pressure steam. *Lighting* by electricity. Furniture consists of iron bedsteads with a vegetable fibre and a horsehair mattress apiece, wardrobe, writing-table and chairs. At the head of the bed is a pocket for the handkerchief. In the private and the semi-private wards there is also a chest of drawers and a washstand for each patient. Those in the general wards use the common lavatories. There is a northern projection from each corridor containing a nurse's room, ward kitchen, W.C. and lavatory. In the latter are glass shelves with numbered sections for each patient's utensils, special mouth-rinsing basins, and enamelled cisterns for the soiled handkerchiefs, which are changed daily. There is a complete bathing establishment for each sex. The main staircases are at the ends of the wings. The rest-shelters are in front of the ground floor, along each wing. There are two one-story summer pavilions beyond each end of the main building, each with accommodation for a nurse and ten patients. The chief medical officer has a separate villa.

Financial: The cost of erection was 623,016 kronen; cost of equipment, 49,900 kr.; cost per bed, 5427 kr.

Annual admissions are about 300.

HÅLAHULT SANATORIUM.

Situated in the Hålahult Crown Forest Domain, in the Province of Nerike in Central Sweden. *Station*: Ervalla. *Grounds*: 300 hectares. *Altitude*: 100 metres above sea level. There is good shelter against wind provided by woods and mountains.

The *building* is of stone, and closely resembles that of the Hessleby Sanatorium, so that no further description is necessary.

Financial: Cost of erection, 639,679 kronen; cost of equipment, 55,241 kr.; cost per bed, 5604 kr.

Annual admissions are about 320. About 55 to 60 per cent are men.

THE SÖDERBY SANATORIUM,

near Stockholm, is surrounded by 24 hectares of pinewoods. It has beds for 198 men, 132 women, and eighty-two children (forty in private or semi-private rooms). There are also two summer pavilions for fifty-six patients. There are two dispensaries associated with it.

Cost of erection over two million kronen (£112,000). Estimated cost of maintenance, 329,000 kr. (£18,100). Cost of food, 1 kr. per day (1s. 1¼d.).¹

¹ "La Tuberculose," January, 1912; "Rev. Int. de la Tub.," April, 1912.

SECTION VIII.—FRANCE AND HER COLONIES.

CHAPTER LI.

THE chief antituberculous measures in France have consisted in the establishment of dispensaries, which are very numerous, and of hospitals or sanatoria for children. Recently, however, a number of sanatoria have been erected in the country. I have been unable to obtain authoritative and complete details concerning the latter, the best books dealing with the subject being out of date and undergoing revision.

In addition to the Central French Association for Prevention of Tuberculosis, there are thirty provincial and fifteen Parisian affiliated societies, besides numerous special societies dealing with separate aspects of the subject. Much attention is given to the protection of children from tuberculosis. In addition to numerous hospitals at the seaside for tubercle of bones and joints, there are societies for holidays in the mountains, for the proper feeding of young children, and the like. The Œuvre Grancher takes the children of tuberculous parents who have unsatisfactory homes, and boards them out in the country. There is evidence that these children mostly grow up healthy and strong. Every *arrondissement* of Paris has its own school colony in the country. Most of the urban hospitals in Paris and the provincial cities have separate pavilions for the tuberculous.

There are six agricultural colonies for tuberculous convalescents :—

Department.	Society.	Colony.	Opened.
Seine et Oise	Œuvre des Colonies Agricoles	Noisy le Grand	1903
Oise	—	Le Menillet	1904
Haute Marne	—	Tremilly	1900
Doubs	—	Rougemont	1907
Seine et Oise	Œuvre de Villepinte	Champrosay	1902
Alpes Maritimes	Col. Agricole de Cannes	Le Cannet	1906

FRENCH COLONIAL SANATORIA.

Of these there is now only one at Lang-Sa in Annam. The one formerly in existence in Algiers is closed.

CHAPTER LII.

SANATORIA IN NORTHERN FRANCE.

COMPRISING the part north of a line from the mouth of the Loire to Pontarlier, and including the departments of the Loire Valley.

SANATORIA FOR ADULTS.

Name and Locality.	Opened.	Terms in Francs per Day.	Medical Officers.	Cases Ad- mitted.	Beds.
NORD—					
Montigny en Ostrevent San.	1905	4·0	Drs. Guinard and Maljean	E., m.	110
PAS DE CALAIS—					
Cottage des Dunes	—	3-4	See Children's San.	S.	100
OISE—					
Villemin San., Angicourt	1900	F.	Assist. Publique	E., m.	170
San. Convent of Borau	—	—	—	—	—
SEINE ET MARNE—					
San. d'Avon Fontainebleau	—	—	Dr. A. Salivas	Private	—
SEINE ET OISE—					
Bligny San.	1903	4·0	Dr. Guinard	E., m.	120
" "	1909	4·0	" "	E., w.	110
Brévannes Hospice	1862	F.	For the Paris Hosps.	A.	690
San. de Buzenval, St. Cloud	—	7-10	Dr. Poussard	Private	20
San. Pop., d'Ivry	—	—	—	—	—
LOIRET—					
San. de Meung-s.-Loire	—	12-18	Dr. L. Leriche	Private	17
Chécy San. (for Orleans)	1902	—	Dr. de Bienne	E.	20
SEINE INFÉRIEURE—					
San. de la Forêt de Rouvrai	1905	2½-3½	Dr. Cotoni	E., w.	30
MEURTHE ET MOSELLE—					
San. de Lay St. Christophe	1902	—	Œuvre Lorraine de la Tub.	E.	80
LOIR ET CHER—					
San. des Pins	1900	13-25	Dr. Hervé	Private	54
LOIRE INFÉRIEURE—					
Nantes San.	—	—	—	—	—

SANATORIA FOR CHILDREN.

Name and Locality.	Opened.	Terms in Francs per day.	Medical Officers.	Cases Ad- mitted.	Beds.
NORD—					
Hôp. Marit. Mals les Bains	1900	2-5	—	S.	55
PAS DE CALAIS—					
Hôp. Marit. Berck-s.-Mer.	1861	—	Assist. Publique	S.	750
Hôp. J. N. Rothschild „	1897	—	—	S.	100
Hôp. Cazin Perrochaud, Berck Plage	1897	40-50 p. m.	—	S.	400
Hôp. Marit. St. Pol-s.-Mer.	1905	1-50	—	S.	400
San. Michel	—	—	Private	S.	—
Cottage des Dunes, Berck Plage	—	3-4	—	S.	100
CALVADOS—					
Maison Evang. de Benzeval	1899	—	—	S.	30
ILLE ET VILAINE—					
Hospice St. Joseph, St. Broladre	1900	—	—	S.	40
SEINE INFÉRIEURE—					
Hôp. Pasteur, Le Havre	—	—	Dr. Frottier	S.	—
FINISTÈRE—					
San. Populaire, Roscoff	1903	1-80	—	S.	200
LOIRE INFÉRIEURE—					
Hôp. Marin de Pen Bron, Le Croisic	1899	1-80	—	S.	300
Maison de St. Jean, Le Croisic	1900	2-2-50	—	S.	300
Institut Verneuil, La Baule	—	10	—	S.	60
SEINE ET OISE—					
Hôp. d'Ormesson	1888	2-0	Œuvre des Enf. Tub.	b., 3-9	130
Villepinte Hôp. San.	1898	3, F.	—	g., w., 6-30	290
Forges les Bains	1859	F.	Dr. Doumenge	S., 2-15	224
Hôp. de Bourg la Reine	1903	2-50, F.	—	g., 11+	99
MARNE—					
Hôp. de Villiers-s.-Marne	1891	2-0	Œuvre des Enf. Tub.	b., 9-14	220
INDRE ET LOIRE—					
Asile de Clocheville, Tours	—	—	—	S.	—

Contractions: F. = free; E. = early cases; A. = advanced cases; S. = surgical cases; m. = men; w. = women; ch. = children; b. = boys; g. = girls.

THE MONTIGNY EN OSTREVENT FAMILY SANATORIUM, near Douai, is *situated* in the midst of a park, protected on the north and west by a forest of 86 hectares. The climate is said to be mild and equable throughout the year. *Soil*: Sandy. *Grounds*: 21 hectares. *Altitude*: 37 metres.

Buildings: These are arranged in an unusual way, and consist of twenty-four villas for families, two large pavilions for the unmarried over sixteen years of age, a medical pavilion with four

isolation rooms for infectious diseases, an engine block and other subsidiary structures. The *family villas* are arranged in pairs, each in its own garden. Each one is of two stories, and has on the ground floor (which is raised on arches) the kitchen, dining-room, and W.C. ; on the first floor a south room with bow window opening on to a large balcony, and an east bedroom for wife or friend. On the second floor there is only an east bedroom for the children ; none over the patient's bedroom. The dining-room is floored with xylolith ; walls are oil-painted. Furniture, linen and utensils are provided by the sanatorium. The *large pavilions* have each twenty-six beds. The ground floor is raised one metre above the soil, and has on the south side two large common rooms, one for dining-room, the other for work or games, and on the north side of the long corridor, W.C.'s, douche- and bath-rooms, box-room, cloak-room and entrance hall. The kitchen department is in the basement. On the first floor, separated by the sister's room (which has inspection windows to the wards), are two wards, each with six beds, six cupboards and balcony. North of the corridor are two lavatories and W.C.'s. At the eastern end is a single-bedded room for newcomers. The second floor is similar. There is a rest-shelter for each of these large pavilions at a short distance in the grounds. Each building (whether villa or large pavilion) has its own arrangements for preparing food and for *heating*. The villas have open fire-places, the large pavilions are heated with low-pressure steam. The whole sanatorium is *lighted* by electricity. The sewage is transported by water carriage with the help of Shone's ejectors to septic tanks and bacteria beds.

Financial : The sanatorium was erected at the expense of the Ligue du Nord contre la Tuberculose. It receives a subvention of 40,000 frs. annually from the town council of Lille. There is also an endowment to help those who cannot afford the whole cost of residence. Cost per head per day for food 2·59 frs. ; for administration 3·64 frs. Average payments by patients 3·50 frs. To reduce the expenses, and increase the number of suitable admissions, an arrangement has been made with the Œuvre des Sanatoriums Populaires of Paris, which has more applications for admission than it can satisfy, and lower expenses of administration because of the

larger numbers dealt with. Patients from the *Département du Nord* will have priority; women are now sent to the Bligny Sanatorium.

Statistics: During 1911 there were 159 patients under treatment, of whom 115 were admitted during the year. Average number of patients in residence: Forty-five.¹

Staff: Senior medical officer, Dr. Maljean.

THE ANGICOURT SANATORIUM,

built by the *Assistance Publique* of Paris, with the help of 1,200,000 frs. from the *Pari Mutuel* (which receives the taxes on horse-racing).

Situation: A plateau near Liancourt overlooking the valley of the Oise to the south-east, and surrounded on three sides by pine woods. In order to increase the shelter, the building has been sunk, and the ground in front of it cleared away. *Grounds*: 28 hectares. *Altitude*: 95 metres. *Soil*: Limestone.

Buildings: Owing to the solid method of construction, and to unexpected difficulties with the site, four successive contractors failed over the undertaking, and only part is finished.

The complete sanatorium will consist of two symmetrical residential blocks united by a covered way with the dining-saloon in the centre, behind which are the administrative portions. Each residential block will be of the Hohenhonnef type, and will look south-south-east. It is the more southerly block which has so far been opened. The building is of stone, with three stories and attics. Everywhere angles have been rounded, walls are painted, floors of hard polished wood. In front of the ground floor is a fresh-air gallery or verandah extending the whole length of the building. Behind this is a corridor three metres wide, giving access in succession to the consulting-rooms, bath- and douche-rooms, W.C.'s, a large cloak-room with lockers for each patient, a lavatory, a library, and a large day room which occupies the whole south-west extremity. Staircases at each end lead to the upper floors. Next the central staircase on the first floor is a lavatory behind, three single-bedded rooms in front. Farther on the corridor leads to other wards, each for three beds, excepting one at the south-

¹ "Bull. Trimestriel de la Ligue du Nord contre la Tuberculose," 15 August, 1912.

west end which will serve as an infirmary and contain seven beds. Each room has a chimney and is 3·85 metres high. The windows are large with numerous panes and fanlights above. Outside are wooden sun-blinds. The next floor is similar. Each floor has on the north side an attendants' room, a dirty linen receptacle and W.C.'s. It appears that the attic story is also to be used for patients, although it is far less suitable than the others.

The dining-room lies in the centre of the corridor which runs from the north-east wing of the present building to the south-west wing of the second pavilion. Behind this, connected by a covered way, is the kitchen. Behind, but on a higher level, are two buildings, one of which is for the house physicians and staff, the other for laundry and engine-house, near the water reservoir. Farther north, in a special garden, is the medical director's house. Farther west, masked by the trees of the park, are the cowstalls, the stables and mortuary.

REFERENCES.—Sersiron, "Les Ptisiques Adultes et Pauvres," Paris, 1898; Grillot, "Le Sanatorium Français," Paris, 1900.

THE BLIGNY SANATORIUM

was built by the Œuvre des Sanatoriums Populaires de Paris, twenty-two miles south-west of that city. It is surrounded by a well-wooded park of 220 acres.

It consists of two pavilions, facing south and south-east, united by open-air galleries looking south-south-east, all of two stories excepting the extremity of the east wing, which has also a basement, and four towers which have an additional top story.

The fresh-air galleries are divided into a north and a south portion. Behind their centre is the dining-saloon, running north, which leads to an administrative portion containing consulting-rooms, etc. The main staircases are at the junction of the fresh-air galleries with the wings. Near them are the bathrooms, douche-rooms, W.C.'s and nurses' rooms. The wards are mostly for three beds apiece, separated by lavatories, all to the south side. Isolation wards and nurses' rooms are at the extremity of each wing. In the basement of the east wing are the douche-room, nurses' quarters, and various medical rooms. Over the dining-room and sewing-room are a day room

and a chapel. Over the administrative portion are the medical quarters and a ward kitchen. The main kitchen is under the dining-room. The interior is finished in good sanatorium style.

The *staff* includes three medical officers, thirteen sisters and nearly sixty others.

REFERENCES.—“Zeitschr. f. Tuberkulose,” Nov., 1903; “La Lutte Antituberculeuse,” 30 Nov., 1901.

THE MEUNG-SUR-LOIRE SANATORIUM,

on the borders of Touraine, is on sandy soil, and is said to enjoy a dry and bracing climate, with a large amount of sunshine. The grounds, of considerable extent, are covered with fir-trees and other evergreens. The building was originally a chateau, but has been entirely reconstructed for its present purpose. Bedrooms have a southerly aspect, large windows, washable walls, and simple furniture. Only early cases are admitted. The sanatorium is two hours by rail from Paris, on the line to Bordeaux.

THE ORLEANS SANATORIUM

is a long straight building of two floors and attics, with a verandah in front of the ground floor, bedrooms above, and a fresh-air gallery at each end. The administration block is behind, united to it by a covered way.

THE SANATORIUM DE LA FORÊT DE ROUVRAI

is *situated* 10 kilometres south of Rouen, in a large pine forest on a gentle slope 2 kilometres from the river Seine, protected on three sides from wind. It owes its existence to the Société Normande d'Hygiène. *Altitude*: 50 metres.

Buildings are of one story, built of brick and *ciment armé* over cellars. The patients' rooms open on to a large fresh-air rest-gallery, and have porphyrolite floors, painted walls and *calorifère* low-pressure *heating*.

The *terms* are reduced for the poor by contributions from the Assistance Médicale.

REFERENCES.—Giraud and Cotone, “Proc. VI Internat. Congress on Tuberculosis,” Washington, 1908.

THE HÔPITAL GÉNÉRAL DE ROUEN

has two wooden shelters in the grounds for tuberculous boys and girls respectively, who sleep in the wards and stay two to three years.¹

THE LAY ST. CHRISTOPHE SANATORIUM,

near Nancy, consists of two wings of two stories, united in one line by a double tier of open-air galleries, behind which is the administration block. A verandah runs in front of the basement the whole length of the building. Drs. Spillmann and Haushalter have been mainly concerned in starting this sanatorium.¹

SANATORIUM DES PINS

is *situated* on the line to Toulouse, two and a quarter hours by express from Paris, in a district which is said to enjoy a very equable climate, free from winds and with very few wet days. The sanatorium is sheltered on all sides by woods of pine, oak and acacia. The *soil* is of gravel. *Altitude*: 150 metres. There are altogether four buildings, with mostly but not exclusively a southerly aspect. The original building contains six bedrooms, the kitchen, dining-room and administration. The annexe contains twenty-two bedrooms on two floors. Opposite to it, separated by a courtyard, is a third small pavilion intended for such cases as require complete isolation. The last erected building is one for twenty-one patients, three being on the ground floor, the rest on two upper floors. These have sixty-five cubic metres air space, the walls extra thick, the floors partly wood, partly iron, to prevent transmission of sound; and the partitions between contiguous rooms containing an air space. Steam laundry, engine-house with destructor. *Heating* by low-pressure steam, a hot plate under the dining-room table; electric *lighting*. The walls are everywhere washable; the floors of parquet, or xylolith or covered with cork carpet. Angles are rounded; windows extra large, in a line with the doorways, and provided with sun-blinds. There are five fresh-air galleries, four of which are in the gardens.

¹ Grillot, *loc. cit.* (for view).

There is a good hydropathic installation; the W.C.'s are mostly disconnected by ventilating lobbies. There are two resident medical officers.

THE ŒUVRE DES ENFANTS TUBERCULEUX.

This consists of two sanatoria for children, the Ormesson Hospital for boys up to the age of twelve, and the Villiers-sur-Marne Hospital for those from twelve to sixteen; also of a dispensary in the Rue Miromesnil, Paris, and four agricultural colonies under resident medical officers, at Noisy le Grand, Tremilly (Haute Marne), le Menillet (Oise) and Rougemont (Doubs). All phthisical children without selection are received at the dispensary and sent on to the hospitals, where they are kept until they can go to work in the agricultural colonies or elsewhere. The whole organization was founded and maintained by public subscriptions. Treatment is free of charge.

THE ORMESSON HOSPITAL

was started in an ordinary house in 1888; enlarged to 100 beds in 1890 with the help of wood from the Exposition Universelle; and completely rebuilt in 1896. It is *situated* on a breezy plateau overlooking the valley of the Marne just above Champigny. *Grounds*: 2·3 hectares, consisting of playgrounds, garden, cultivated and grass land. *Soil*: Calcareous. *Altitude*: 114 metres.

The *building* is of one story, and consists of a large central glass-covered winter garden with huge windows to the south, and forming with the administration offices a central axis, on either side of which are two parallel pavilions, making with it a letter **H**. One of these pavilions forms the refectory, and has at the western end the kitchen block. The other three form dormitories, each for about forty beds, and having at the free ends lavatories, bathrooms and water-closets. The latter are arranged in radiating compartments, and can be collectively overlooked by one person. They are isolated by the lavatories and bathrooms, which can be ventilated from end to end. The sisters' rooms lead off the dormitories. The beds are of enamelled iron; floors are of wood in the dormitories, of tiles in the dining-hall; the walls everywhere washable, with rounded angles.

Windows are large, of the usual French type, in three parts, with the tops rounded. The whole place was exquisitely clean when I visited it. Along the south side of the building is an open verandah on each side of the projecting winter garden. The children in the playground are placed under the supervision of two men ; indoors they are under the care of the sisters.

THE VILLIERS-SUR-MARNE HOSPITAL

is about three miles from that of Ormesson, and stands on the same high plateau. It is in the midst of cultivated fields and gardens, at the extreme end of the village, and has $9\frac{1}{2}$ acres of ground belonging to it. The southern side is separated from the road (which is not a main road) by a large gravelled courtyard. On the other side of the road is a patch of garden bounded by trees. The grounds on the north are occupied by playgrounds and meadows ; they rise towards the fortifications of Villiers, with wooded crests in the distance.

The *building* consists of three blocks of two stories arranged in a line. The central block contains on the ground floor two large day rooms, the library, drug-room, and doctor's room ; and has in front along the south side a verandah with stone arches. On the floor above is a dormitory for the more serious cases, with a single row of beds. It is incompletely divided into separate rooms, and opens in front into a covered balcony with stone arches. Attached to the dormitory are two rooms for the nurses.

The left or eastern wing, called the Pavillon des Enfants de France (fig. 24), is a large hall containing 10,000 cubic metres of air, or 120 cubic metres per head, with an ogival roof rising to 12 metres above the ground, divided into a central and two lateral naves, and partly composed of glass. This is supported by graceful iron columns, and provided with a gallery 6 metres wide, which runs all the way round. The building is of brick and stone, coated internally with white impermeable enamel, the angles being also rounded. The centre of the ground floor is tiled, and contains the ventilating openings and ozonisers, and is furnished with a few chairs and tables. The part underneath the gallery is slightly raised above the ground level. This and the gallery have varnished



FIG. 24.—THE VILLIERS-SUR-MARNE HOSPITAL—SOUTH FRONT

[See page 322

boarded floors, and are provided with a single row of blue enamelled iron beds radially arranged, together with other simple furniture. The windows are very large, being 2 metres wide and 4 metres high. They consist of two parts, of which the lower is a sashed window (English fashion); the upper a French window in four pieces, each of which can be separately opened, two moreover being perforated. The hall rests on a basement 3 metres deep impermeable to moisture, and containing the heating and ventilating apparatus, the bacteriological laboratory and electric-lighting machinery.

In this basement, beside the calorifer, is a reservoir for a medicated solution of creosote, turpentine and eucalyptol, which serves to medicate and purify the incoming hot air. The fresh air from outside passes through metallic gauze either directly into the hall or past the warming apparatus. The hot and cold air inlets are placed side by side in the embrasures of the windows. Round the galleries at the head of the beds are a series of tubes with trumpet-shaped ends, which supply ozone produced by the dynamo. The windows also allow of the direct entrance of fresh air. The vitiated air is carried off through holes in the roof with the help of a jet of steam in a turret. In this way at least 200,000 cubic metres of air are provided in the hall *per diem*. Eighty children can sleep in this hall, and two sisters, one for each floor, can readily look after them. At the northern end of the Pavillon des Enfants de France, on the ground floor, are the dressing-rooms, lavatories and bathroom. The latter forms half a circle, and is incompletely divided by radiating partitions 2 metres high, separating ten white enamelled iron baths. Hot and cold water are laid on in the bathrooms and lavatory, which are arranged in English fashion, and (like the rest of the building) are heated with hot-water pipes. The walls are covered with Dutch tiles, and have rounded angles; the floors are of mosaic; the wash-basins of white stoneware on white marble. Uniting the Pavillon des Enfants de France to the central block is the grand staircase, behind which are water-closets and lavatories on each floor.

The western wing is older than the eastern, and contains on the ground floor the kitchen department and chapel. On the upper floor are the quarters for the *personnel*.

The hospital is *lighted* with electric light. Filtered and sterilized water is laid on in the sick ward.

To the west side of the hospital grounds is a long line of one-story buildings, beginning with the lodge, and including the laundry, steam disinfecter, linen store, clothing store, provision department, and workshops for repairs. They are large enough to serve all three establishments—the dispensary and the two hospitals at Ormesson and Villiers. The treatment at Villiers is of the same character as at Ormesson.

THE VILLEPINTE SANATORIUM.

Another important organization is the Œuvre de Villepinte, which has founded three homes or sanatoria for girls and young women. One of these is at Champrosay, for young anæmic workwomen with a predisposition to tuberculosis. Another is the Alice Fagniez Sanatorium near Hyères, open 30 October to 1 July, for girls in an early stage. The third is at Villepinte, for those aged six to twenty who are definitely phthisical: married women are not admitted. There are also two dispensaries in Paris and an agricultural colony at Champrosay.

CHAPTER LIII.

SANATORIA IN THE SOUTH OF FRANCE.

SOUTH of a line from the mouth of the Loire to Pontarlier.

SANATORIA FOR ADULTS.

Name and Locality.	Opened.	Terms in Francs per Day.	Medical Officers.	Cases Ad- mitted.	Beds.
PUY-DE-DÔME— Durtol San.	1896	14-17	Dr. Sabourin	E.	60
CREUSE— Teachers' San., Ste Feyre	1906	—	Dr. Berthelon	E.	102
CANTAL— Dienne near Murat	1903	—	Dr. Markeszuwski	—	—
AVEYRON— Aubrac San.	1900	10 and 20	Dr. Saunal	—	50
RHONE— Magny for Versailles	1904	—	—	—	—
AIN— F. Mangini San., Hauteville	1900	2'50-5'0	Dr. Dumarest (for Lyons)	E.	120
Dumarest San., „	1912	15-35	Dr. D. and Dr. Alexandre	E.	55
Bellecombe San., „	—	—	Dr. Dieuzeide	E.	—
VAR— Alice Fagniez San., Hyères	1896	F.	Assistance Publique (Paris)	E., w.	32
ALPES MARITIMES— Jewish San., Cimiez	1890	F.	Dr. L. Bar	E.	17
GIRONDE— Feuillas Pessac San.	1902	6-8, ch. 2'50	Dr. Magne	E.	65
BASSES PYRÉNÉES— Trespoeys San.	1896	16-20	Dr. Crouzet	E.	32
Beaulieu San., Cambo	—	12-20	Dr. Hamant	—	—
GARD— San. du Mont Duplan Nîmes	—	7'0	Dr. A. Beguin	—	—
DRÔME— Home San., St. Paul Trois Châteaux	—	—	Dr. S. de Rouville	—	—

SANATORIA FOR CHILDREN.

Name and Locality.	Opened.	Terms in Francs per Day.	Medical Officers.	Cases Ad- mitted.	Beds.
CHARENTE INFÉRIEURE—					
San. de Fouras	—	—	School San.	Pretub.	—
San. de St. Trojan, Ile d'Oleron	1903	1'70-2	—	S.	200
GIRONDE—					
San. Pop. d'Arcachon	1902	2'0	—	S.	200
„ Feuillas-Pessac	1902	2'50	Dr. Magne	E.	65
LANDES—					
Asile Ste. Eugénie, Cap Breton	1903	1'80, F.	—	S.	60
BASSES PYRÉNÉES—					
Hendaye San.	1900	F.	Ass. Publique, Paris	S.	100
PYRÉNÉES ORIENTALES—					
San. de Banyuls-s.-Mer.	1901	1'70-2	—	S.	212
HÉRAULT—					
San. de Cette	1903	1'25	—	—	450
VAR—					
San. Alice Fagniez, Hyères	1895	—	October-June	g., E.	—
„ Pradet, „	1905	—	June-October	g., E.	—
Hôp. Renée Sabran, Giens, Hyères	1903	2, F.	For Lyons	—	150
San. École de San. Salva- dour	—	—	—	—	150
ALPES MARITIMES—					
Asile Dollfus, Cannes	1900	—	—	—	45
INDRE—					
Pellevoisin San.	—	1-2, F.	—	b., 1-5 g., 1-18	— —
HAUTE GARONNE—					
Salies du Salat San.	—	1'50-4	Thermal Station, Dr. Lautré	S.	66
HAUTES PYRÉNÉES—					
Asile Phtisiother. d'Argèles	—	300 per annum	—	g., E.	—

For contractions, see p. 315.

THE DURTOL SANATORIUM,

or the sanatorium of the Château of Durtol, is *situated* at a little village three kilometres from the large town of Clermont-Ferrand, half an hour's drive from the Clermont station, or nine hours' journey from Paris. Being somewhat raised above the plains, it has a good view of the valley of Clermont and of the distant mountains of Forez. It is open to the south, protected to the north, north-east and north-west by mountains and hills thickly wooded with pine trees, and provided with numerous good roads and paths. The strong winds, which come from the north-east, are completely

warded off by the woods extending the whole length of the park, which is of five hectares. The climate is mild, rainfall regular but not abundant, and prolonged droughts are unknown. *Soil*: A very pervious black volcanic sand. *Altitude*: 520 metres.

Buildings: Consist mainly of an old Louis XIV château, altered and added to by the present proprietor. The bedrooms are on the two upper floors, and are nearly all provided with chimneys. Fires, however, are seldom needed.

The floors are covered with linoleum; the walls with anaglypta painted and varnished, the angles rounded. There are two dining-rooms, the larger of which opens by folding doors into a room for theatrical representations. There is also a large library, a billiard-room, music-room, laboratory and chapel. There are seven large verandahs for rest in the open-air. Some of these are in the woods. The sanatorium has its own dairy farm. Hydropathy is not employed excepting in the form of cold bathing or friction with cold water. There are three physicians.

THE AUBRAC SANATORIUM

is *situated* at the foot of a chain of mountains and on the edge of a magnificent forest of beech-trees, 500 metres above the village of Aubrac. *Altitude*: 1400 metres.

Buildings: The original structure is a large wooden building in Norwegian style, in two symmetrical parts for the two sexes, with separate dining- and drawing-rooms, washable varnished double walls containing a layer of powdered cork, large fresh-air galleries, furniture of lacquered wood or iron provided with moleskin covers, low-pressure steam heating, etc.

Another building in granite has been added. The south front of this is straight, with projecting pavilions in the centre and at the ends, between which are placed on the ground floor two long southerly fresh-air galleries, with movable glazed screens, and on the first floor two long balconies. On the second and third floors every room has its own balcony. Nothing but cellars are placed in the basement. On the ground floor are the kitchens, coal-cellar, store-rooms and heating apparatus, with windows and doors to the north. On the first floor is the large dining-room, 18 metres long

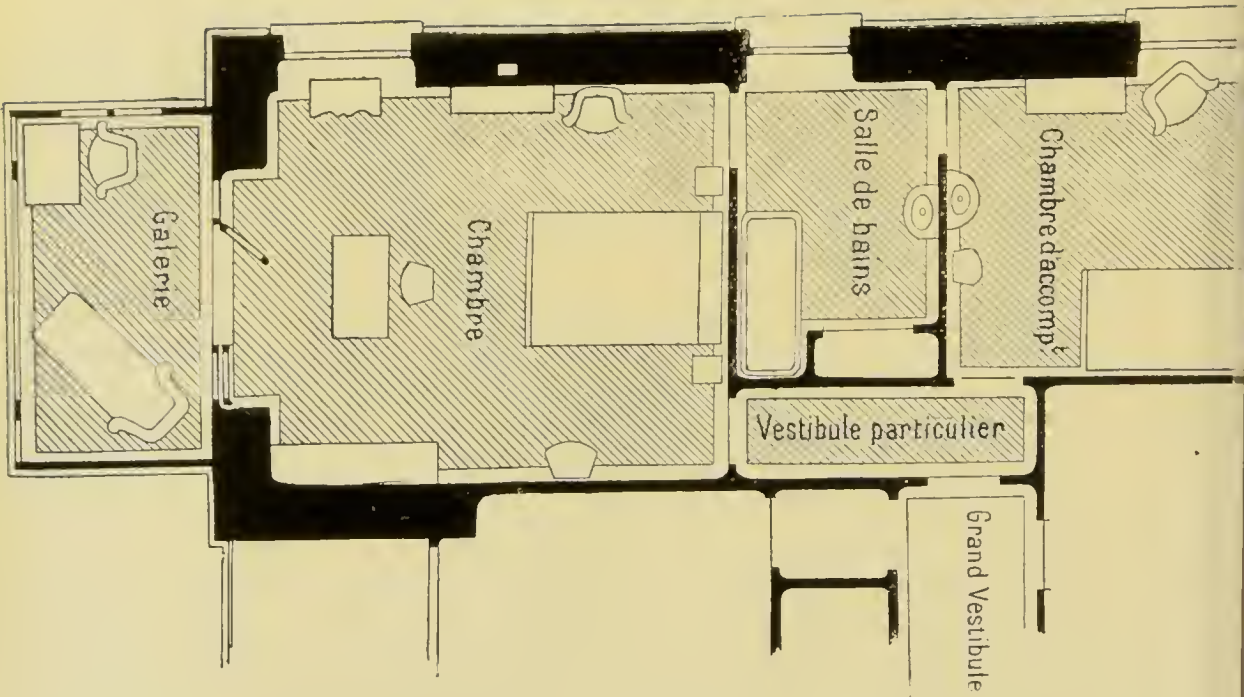
× 6 metres wide × 4 metres high, with three more common rooms, and to the sides the office and three bedrooms. On the second and third floors are more bedrooms ; large ones in the centre and wings, smaller ones between. The attics are occupied by linen-rooms, box-rooms and staff-rooms. In the wings also are quarters for nurses and medical officers, laboratory, surgery, dark-rooms, etc. In a central pavilion to the north is the grand staircase and electric lift. Water-closets and bathrooms and subsidiary staircases are placed in the wings. On the higher floors the former occupy built-out pavilions on the north side. All the bedrooms are square, the smaller ones 16 square metres × 3·50 high, the larger ones half as big again. With few exceptions they are on the south side, in single row ; each has rounded corners, a balcony one metre wide, a chimney for ventilation, large window with fanlight over the casement, large door with fanlight over it exactly opposite, and beyond this a large corridor window. The building is symmetrical, one half for each sex. There is a northern verandah and a northern balcony between the projecting pavilions for use in hot weather. *Heating* by low-pressure steam ; *lighting* by electricity.

HAUTEVILLE SANATORIUM,

for the city of Lyons, has been built by private initiative, largely owing to the exertions of Dr. Dumarest.

Situation : An undulating plateau overlooking the village of Hauteville, sheltered to the north by the Jura Mountains, and in other directions by wooded hills. *Altitude* : 900 metres. *Soil* : Sand over limestone.

Buildings : The sanatorium consists of three buildings, a centre and two wings at obtuse angles, all three united by open-air galleries. The centre block which looks south-east, has three stories and a basement, and a tower in the centre. On the ground floor it has a large dining-room on the south side, flanked by two day rooms for men and women respectively. The wings have rooms behind as well as in front of the corridor. Running along the south side of all three buildings are wide and lofty fresh-air galleries. There are no verandahs in front of the bedrooms. The walls are smooth with rounded corners ; the floors of oak-parquet treated with paraf-



Grand Vestibule

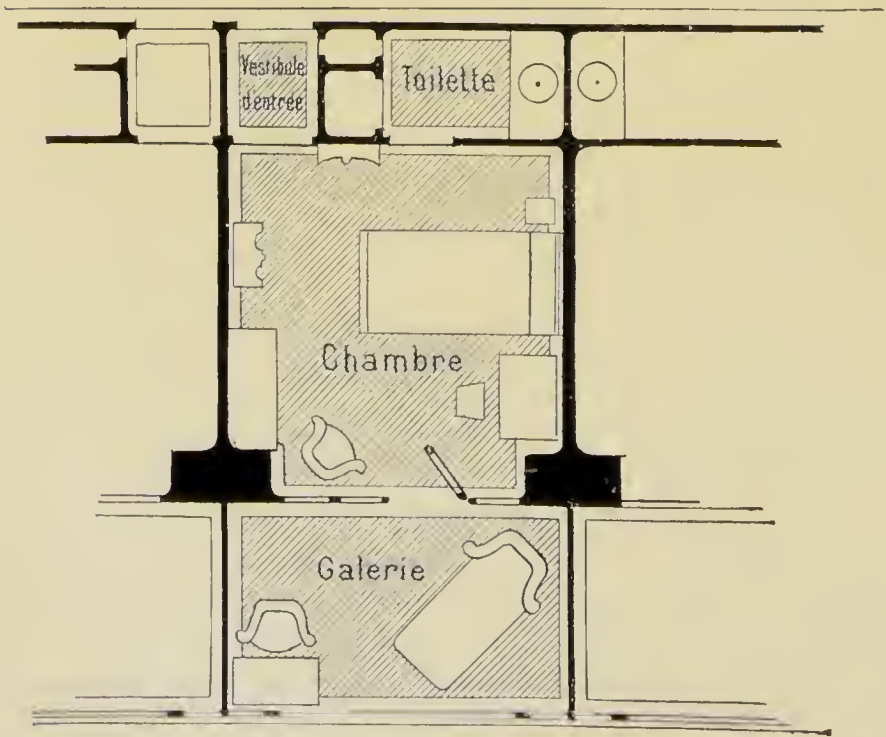


FIG. 25.—THE DUMAREST SANATORIUM

[Face page 329

fin and laid over asphalte. The sanatorium has electric *lighting*, low-pressure steam *heating*, a complete system of baths, steam disinfecter and laundry. Attached to it is a well-equipped institute with four laboratories, under the care of Prof. Arloing and Dr. Guinard.

THE DUMAREST SANATORIUM,

Beligneux near Lompnes, Ain. *Station*: Jenay (viâ Culoz or Amberieu). *Situation*: On the Hauteville plateau between Geneva and Macon. This plateau consists of open country, surrounded by a fringe of wooded hills, and protected to the north by the chain of the Jura Mountains. Such a situation presents some advantages over an Alpine valley, being drier, better ventilated, and less exposed to extremes of temperature. The climate of Hauteville is cold and dry, fresh in summer, decidedly cold in winter. *Soil*: Calcareous and absorbent. *Altitude*: 920 metres. *Grounds*: 25 hectares, overlooking the plateau of Hauteville, containing two small lakes, meadows, garden and woodland.

Buildings: A large four-story pile with balconies on every floor, and two projecting portions at either end containing suites of rooms. The plans give to every room a small warm dressing-room, an airy bedroom, and a large glazed balcony on to which the bed can be pulled if desired. The suites of rooms have a large bath-room in place of a dressing-room, and behind this a room for a companion, communicating with the bedroom by a separate passage. There is water laid on for the use of every patient, in addition to a common bath-room on every floor. The furniture and decorations have been specially designed to allow of washing and disinfection and to stand hyperaeration. There are a number of large common rooms. Central *heating* of hot water. Electric *lighting*. Passenger lift (fig. 25).

Staff: Medical director, Dr. F. Dumarest; resident medical officer, Dr. R. Alexandre; also a lay director and a sister.

THE SANATORIUM GIRONDIN,

at Pessac, is on the main road from Bordeaux to Arachon, 8 kilometres from the former city, on one of the most elevated spots in

the neighbourhood, next to some large pine-woods. *Grounds*: 18 hectares. Electric *lighting*. Central *heating*.

Cases of open tuberculosis are not received.

THE TRESPOEY SANATORIUM.

Situation: About half an hour's drive from Pau, in the midst of a cultivated plain, on the edge of the valley of the Ours. The sanatorium is on a steep hill, with a fine view of the river valley and distant Pyrenees. *Grounds*: 7 hectares of garden and woodland, surrounded by meadows. *Soil*: 15 to 20 feet of sand. *Altitude*: 220 metres. *Climate*: Mild, with very little wind.

Buildings: Are three in number, the chief of which is of three stories. In the basement are the kitchen department and bathroom. On the ground floor the dining-room, library, drawing-room, consulting-room, and two rooms for patients. The next floor has six bedrooms, and the top floor two bedrooms for patients. There is no lift. The patients' rooms are all to the south, with at least one south window; they vary in size from 60 to 110 cubic metres. Each has its own chimney and open wood fire; ordinary French windows; papered walls, without rounded corners; pinewood floors, without carpet or curtains; and varnished pitchpine furniture, without carpets, pictures, or curtains in any of the rooms. The *lighting* is by electricity. Near the chief building is a fresh-air gallery with a southerly aspect; and another looking north. There are three other large shelters in the garden. The annexe, which is a building of two stories, contains bedrooms for fourteen patients; it communicates with the main block by a covered way. The third building, a little distance off, has nine bedrooms.

SECTION IX.—GERMANY.

CHAPTER LIV.

GERMAN SANATORIA.

THERE are now 147 sanatoria for tuberculosis in Germany, with 13,890 beds. Nineteen are full-price institutions (charging from 9 to 15 marks per day with extras) having a total of 1201 beds. They are mostly in private hands, often in the shape of a joint-stock company. There are about twenty-three more sanatoria which receive middle-class patients at reduced rates (10 at less than 6 marks per day), with a total of 1138 beds.

Of the Folk-Sanatoria, thirty-four have been erected or purchased by Insurance Companies, and many more are chiefly supported by such companies. Five have been erected by sick-benefit societies, two by the proprietors of industrial concerns for their own work-people, three by railway companies or their employees. These sanatoria are mostly restricted to the insured members of the particular company, benefit society, or industrial company. Forty-nine have been erected by charitable associations, often such as have been started for this purpose. A few are the result of legacies or the munificence of individuals.

Of children's sanatoria there are fifteen in Germany, with 861 beds. Eighteen sanatoria for adults also receive children. In addition to this, there are about sixteen convalescent homes for tuberculous patients (chiefly children) and about ninety convalescent homes (with nearly 8000 beds) for children threatened with tuberculosis, or scrofulous, or merely run down in health, exclusive of convalescent homes that do not admit tuberculous children. Some of these are on the sea-coast, others in the mountains.

There are over ninety Forest Convalescent Stations with nearly 2800 beds for men, and nearly 5200 beds for women and children.

Many of these have medical officers attached to them. In some arrangements are made for schooling. These institutions are sometimes only used in the day-time, at others also at night. The charges vary from 0·30 to 2·50 marks per day, or day and night, sometimes including travelling expenses. There were about a dozen Forest Schools in Germany in 1910, with over 740 places, and a few Country Colonies where children or adults are taught outdoor occupations or ordinary skilled work in the open air.

The number of sanatoria for surgical tuberculosis in Germany is not large. Probably most of these cases are treated (as in England) in urban hospitals and then sent to a Convalescent Home.

Homes are now being erected near some of the large towns and cities for advanced cases of pulmonary tuberculosis; but the supply is still inadequate. There are so far five of these institutions, with 601 beds.

CHAPTER LV.

SANATORIA IN EASTERN GERMANY.

COMPRISING Silesia, Posen, East and West Prussia.

Name and Situation.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Age and Sex.	Beds.
SILESIA—						
Brehmer San., Görbersdorf	1854	Dr. Wehmer	M.	3·60-5·10	m., w.	156
Brehmer 2nd class, Görbersdorf	—	Dr. Jarosch	M.	7·20-10·25	m., w.	179
Römpler San., Görbersdorf	1875	Dr. Birke	M.	9-13	m., w.	85
Marienhaus Schmidtsdorf	1888	Dr. Weicker	M.	8-10	m., w.	35
Krankenheim „	1894	„	W.	4·4·30	m., w.	400
„ „	—	„	W.	—	b., g.	10
Neudorf San.	—	—	M.	7·8·50	m., w.	17
Blitzengrund San.	—	—	M.	6·50-7·50	m., w.	16
Loslau San.	1898	Dr. Schrader	W.	3·50-4·75	m.	160
„ „	—	„	W.	2·0	b.	15
Moltkefels San., Niederschreiberhau	1904	Dr. Muttray	Rail	4·25	m.	104
K. Auguste Viktoria S. Niederzieder	1904	Dr. Libowski	W.	4·30-6·0	w., g.	185
Wald San., Obernigk	—	—	M.	5·50-7·0	—	36
August Hosp., Slawentziz (Count Hohenlohe-Oehringen)	1902	Dr. Stolzenburg	M., W.	4-6	m., w.	90
Reinerz San.	—	—	M.	8-12	m., w.	50
POSEN—						
Kron Prinz Wilhelm San., Obornik	1903	Dr. Kahnert (Ins.)	W.	4	m.	100
Kr. Prinz. Cecilie San., Bromberg	1904	Dr. Scherer	W.	3·50-6·0	w.	135 ¹
Pr. and Prinz. Wilhelm San., Hohensalza	1906	Dr. Sell	W.	1-1·25	b., g.	20
EAST PRUSSIA—						
Frauenwohl San., Allenstein	1907	Dr. Naegelsbach	W.	2·50-5·50	w., ch.	106
Waldfrieden San., Gerlanken	1908	Dr. Froese	W.	1·50	b., g.	12
Hohenstein „ Grieslienen	1903	Dr. Liévin	W.	3·50-4·50	m., b.	72

Abbreviations in the Tables of German Sanatoria: M. = middle class; W. = working class; m. = men; w. = women; ch. = children; b. = boys; g. = girls. One mark is worth about a shilling.

¹ One hundred and twenty in winter.

There are twelve sanatoria in Silesia, three in Posen, and three in East Prussia, with a total of 1983 beds. Four are full-price sanatoria, with collectively 326 beds. Several of these have lower price sections. There are two small children's sanatoria. Five other institutions receive children, but are chiefly for adults.

I. THE GÖRBERSDORF GROUP OF SANATORIA IN SILESIA.

Several important sanatoria are to be found close to the Riesengebirge, near the Bohemian frontier of Silesia. Interesting historically as the site of the first sanatorium opened in Germany, the district is mountainous and picturesque. The soil is mostly of hard rock, dry and free from dust, the climate cool in summer with much sunshine. The barometric pressure is somewhat reduced, though less than in the Alps.

THE BREHMER SANATORIUM

was founded by the late Dr. Hermann Brehmer, the pioneer of systematic sanatorium treatment in Germany. The present building dates from 1862. The oldest and largest private sanatorium in Germany.

Situation: In the valley of the Steine, between the Eulengebirge and the Reysengebirge. The valley, which runs from north-west to south-east, is sheltered by densely wooded heights, which reach an altitude of 800-900 metres above sea level. *Altitude*: 561 metres. *Stations*: Friedland, Dittersbach. *Grounds*: 300 acres, mainly woodland, more than two-thirds laid out with level and variously graduated walks, well provided with seats and summer-houses, stretching up the mountain side.

Buildings consist of a main building with a number of isolated villas. The bulk of the structure is a huge Gothic pile, with towers, turrets and arches, consisting of three parts of different dates, united into one by covered passages and glazed galleries forming a winter-garden. Many of the first floor bedrooms open on to a covered arcade with Gothic arches. Open-air resting galleries were objected to by Brehmer, but have been introduced by one of his successors. The sanatorium has chemical and bacteriological laboratories, a

meteorological observatory, a library with several thousand volumes, model dairy, laundry with disinfectors, and two hydropathic installations.

Since April, 1894, some neighbouring houses in the village have been converted into a "second class" sanatorium, with separate kitchen and common rooms and less luxurious arrangements.

Staff: Eight physicians, six nurses, three bath attendants.

THE RÖMPLER SANATORIUM

was founded by the late Dr. Römpler, within a few hundred yards of Dr. Brehmer's establishment. *Altitude*: 550 metres. *Grounds*: 230 acres, of which seventy are woodland, stretching up the mountain side to a height of 800 metres, with seats, shelters, and kiosks.

Buildings: Two mansions (one four stories high) united by a winter-garden, and converted to their present use. A large verandah surrounds the house, and communicates with a long covered walk extending into the grounds and provided with a concert hall. Two separate villas in the grounds. Hydropathic installation; many common rooms; a chapel in the grounds.

Staff: Three physicians, two nurses, three male and two female rubbers.

DR. WEICKER'S MARIENHAUS SANATORIUM

is *situated* in the same valley as Görbersdorf, less than a mile farther west. *Altitude*: 560 metres. *Grounds*: 16 acres. Patients also have access to the adjoining woods of Count Pless.

DR. WEICKER'S KRANKENHEIM,

in the same village as the above, is chiefly for the insured classes.

Buildings: A number of ordinary village houses converted for the purpose. One of these was a Convalescent Home founded by the late Countess Maria von Pückler in 1883, now used for administration, dining-rooms, and doctors' quarters, and for patients attacked with intercurrent ailments. The other houses contain each a common room, in addition to bedrooms for the patients. Men and women are separately lodged, and have separate collective

dining-rooms. There is also a children's section. There are several large sun galleries. Patients use the *grounds* of the private sanatorium.

Staff: Dr. Weicker has a resident physician for each division. The men have also two or three male nurses, the women a sister and female nurse. In addition to this, one patient in each house is chosen by the rest to act as *Obmann*. He has to take the temperatures every morning and evening (in the mouth), to see that rules are kept, and to report any breach of discipline or any complaint, which must be made in writing. The *Obmänner* collectively meet Dr. Weicker every Sunday, to report progress and make or receive suggestions.

2. OTHER SILESIAN SANATORIA.

THE LOSLAU SANATORIUM

is chiefly for patients from the Silesian Insurance Company. It stands in a well-sheltered situation 300 metres above sea level. *Grounds*: 94 hectares, of which 91 are pine woods. Touching them is a large forest, the use of which is secured by contract.

Building: A somewhat plain-looking structure of wood and iron, with a long fresh-air gallery on the south side in front of the basement, above which are a ground floor and two upper floors. It has a large dining-saloon and day room, balconies to the upper floors, and bedrooms to accommodate respectively one, two, three, and four patients each. *Cubic space*: 48 cubic metres per head; ventilation by open windows and air-shafts. The walls are coated with enamel paint to a height of 2 metres, and above this are colour-washed. The floors are of cement, covered with linoleum. The building is *warmed* by warm-water pipes, and *lighted* by electricity.

There are ten beds for teachers and pupil teachers.

MOLTKEFELS SANATORIUM

is intended for the officials of the Prussian Hessian Railway. It is *situated* on a piece of land crossed by a branch of that railway, between the Hochstein and the Moltkefels of the Iser chain of mountains, protected by a dense wood to the east.

Buildings : The medical officer's house is near the entrance to the grounds. The main block has raised foundations, in front of which is a terrace for walking exercise. The ends of the building are brought a little forward to increase the protection. Near the entrance on the ground floor are the consulting-rooms and bath-rooms, also cloak-rooms with arrangements for brushing clothes. The wards are on the ground floor, first and second floors : twelve being single-bedded with small balconies, and fourteen more reserve beds in the attics. On all floors there are to the north lavatories and W.C.'s, nurses' room, servants' room, and a store for rugs ; also a room for disinfecting spit-cups. *Cubic space* in wards is 30 to 40 cubic metres. Each has a shaft for foul air, extending above the roof.

Three day rooms are provided besides the dining-room ; a little altar is erected on the north side of the latter. The assistant medical officer and a voluntary physician live in the main block. The nurses are in the attics apart from the patients. The inspector lives in the administration block. *Heating* is by low-pressure steam ; *lighting* by electricity. The engine-house is 35 metres east of the main building.

The rest-shelters are brought forward at the sides, and have windows at the back.

CHAPTER LVI.

SANATORIA IN NORTH GERMANY.

COMPRISING Brandenburg, Pomerania, Mecklenburg, Hamburg, and Schleswig-Holstein. There are twelve sanatoria in Brandenburg, one in Pomerania, three in the Hamburg territory, and five in Schleswig-Holstein, with a total of 2537 beds. None of these are full-price sanatoria; two, with 126 beds, are for middle-class patients of small means; and another has a first-class section. Four in Brandenburg, with 397 beds, are homes for advanced cases rather than sanatoria. There are six sanatoria for children, with collectively 487 beds. Two other sanatoria receive children as well as adults.

A forest site of 360 acres at Beetz, half an hour by rail from Charlottenburg, has been devoted to the reception of those awaiting admission to a sanatorium, of convalescents, and of advanced cases of pulmonary tuberculosis. There will be 300 beds.

I. BRANDENBURG SANATORIA.

GRABOWSEE SANATORIUM

was founded by the Berlin Red Cross Sanatorium Society, and is used chiefly by the Berlin and Brandenburg Insurance Companies; also by Berlin shopkeepers and others. *Station*: Fichtengrund.

It is *situated* in the midst of a pinewood, on a hill, eleven kilometres north of Berlin. *Soil*: Sandy diluvium. *Altitude*: 38 metres. *Grounds*: 10 hectares, mostly pinewoods.

Buildings: The sanatorium consists of over two dozen buildings, most of which are light shelters (*Döckersche Baracken*), with double paper walls, similar to those used in the army. When the sanatorium was first opened the patients were exclusively accommodated in these *baracken*, but as time went on a few more substantial structures were erected. One of the shelters is used as a chapel, another as a storehouse, another as the medical officer's residence, another as a workshop, while the rest are summer sleeping quarters for the patients, or (with one side removed) are used as

Name and Situation.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Cases Admitted.	Beds.
BRANDENBURG—						
Auguste Viktoria Heim, Eberswalde	1895	Dr. Schneider	W.	3'75	m., w. }	150
Auguste Viktoria 1st class	—	„	M.	6'0	m., w. }	
„ „ children	—	„	W., M.	—	—	10
Grabowsee San., Oranienburg	1896	Dr. Schultes	W., M.	3'75	m.	200
Kirchenforst San., Belzig	1900	Dr. Fricke	W.	3'75-5'0	m., w.	95
Bleichröder „ „	1903	„	M.	„	m., w.	26
Children's „ „	1903	„	W.	2'50	b., g.	36
Kolkwitz San., Kottbus	1900	Dr. Junker	W.	3'75	w.	110
Rathenow „	1900	Dr. Bock	W.	2-3'50	m.	50
Beelitz Men's San.	1902	Dr. Marquardt	W.	—	m.	499
„ Women's „	—	„	W.	—	w.	346
Viktoria Luise San., Hohenlychen	1902	Dr. Pannwitz	W.	2'50	b., g.	150
Cecilienheim San., Hohenlychen	1907	„	W.	2'50	S., b., g.	150
Müllrose San., Frankfurt	1907	Dr. Starkloff	M.	3'50	m., w.	100
Malchow Home, Berlin	1892	Dr. Wendt	W.	2'20	A., w.	104
Blankenfelde Home, Berlin	1892	Dr. Leopold	W.	2'20	A., w.	78
Buch Home, Berlin	1905	Dr. Reuter	W.	2'20	A., m.	150
Schöneberg Home, Frankfurt	1907	Dr. Brandenburg	W.	2'80-3'25	A., m., w.	65
POMERANIA—						
Forest Home, Kolberg	1903	Dr. Reinke	W.	1'10	b., g.	30
HANSE TOWNS—						
Edmundsthal San. for men	1899	Dr. Ritter	W.	2'0	m.	104
Edmundsthal San. for women	1902	„	W.	2'0	w.	90
Nordheim Stiftung Sea Hosp.	1906	Dr. Treplin	W.	20 per week	b., g.	86
SCHLESWIG-HOLSTEIN—						
Johanniter Hosp., Plön	1881	Dr. Holker	W.	2'75-3'0	m., w., ch. }	70
Warwerort Nurs'g Home	—	Dr. Jochim	W.	2'75	w.	
St. Peter „ „	—	—	W.	2'85	w.	60
Nordsee						
¹ Bethesda Child. San.	1888	Dr. Nicolas	W.	1'80	b., g.	35
Westerland Conv. Home	1899	„	W.	3'50	w.	85

For contractions, see p. 333.

fresh-air rest-shelters (*liegehallen*). Those for the patients' sleeping quarters have eight beds each. Cubic space 30 to 33 cubic metres per bed.

The remaining structures consist of a timber administrative block, two winter pavilions, laundry and disinfecting apparatus,

¹ Free beds.

and the gas-making and storing apparatus. The dining-saloon is a large room, covering 127 square metres. In front of this building is a large fresh-air gallery. One of the winter pavilions, a single-floor structure of similar material, contains twenty-eight beds for patients. The other, with two floors, has fifty-two beds for patients, two day rooms (one covering an area of about 74 square metres), two consulting rooms, two lavatories, water-closets, douche and bathrooms, quarters of the sisters, a room for the bathman, and a common room. The bath and douche rooms are built out, and have a hot cistern over them heated by a steam pipe. Over the main structure is a large cold-water cistern fed by steam power.

There are ventilating shafts in all the rooms, in some cases heated by steam pipes. In the winter pavilions the inlets are near the radiators, the outlet shafts converging to a common chimney over the chief heating apparatus. *Heating* by steam pipes in the winter pavilions, elsewhere by slow combustion stoves with chimneys. *Lighting* is by acetylene gas. There is a steam laundry.

THE BELZIG SANATORIA.

Three sanatoria have been erected by the Berlin Brandenburg Sanatorium Society on 38 hectares (95 acres) of land at Belzig, about seven and a half hours by rail from Berlin. The largest is the Kirchenforst Sanatorium, the second (Bleichröder Stiftung) being erected with the help of a legacy, while the third is a model Children's Sanatorium. The land being somewhat flat, mounds have been heaped up to increase the shelter. The *soil* is sandy, as elsewhere in Brandenburg. *Altitude*, 94 metres. The administrative portions, including engine-house, laundry, disinfector, workshop, laboratory and church, are common to the three sanatoria.

THE KIRCHENFORST SANATORIUM

is chiefly for patients sent by the Insurance Companies. It is a symmetrical building, one side of which is for men, the other for women. The wards, for one, two, four and six beds respectively, are to the south. The main entrance, in the centre of the north side, has a large hall used as a day room, and in front of this the

rest-shelters. The bath and douche rooms are at the ends of the corridors ; the consulting rooms, quarters for assistant medical officers and sisters, the offices, ward kitchens, staircases (two main and two subsidiary) and W.C.'s are all to the north. In the basement is the inhalation room ; in the projecting side masses are the quarters for married officers, inspector, master engineer and gardener. On the first floor are two more day rooms. The large dining-room with lavatory next to it unites the main building with the administration block to the north, and leads to the kitchen department. On the first floor of the administration are store rooms and quarters for the staff. The engine-house and laboratory form two distinct buildings. *Heating* by low-pressure steam. *Lighting* by electricity.

THE BLEICHRÖDER SANATORIUM,

is the outcome of a legacy originally given for tuberculin treatment, but, in consequence of an appeal, used instead for building a sanatorium for the less wealthy middle classes.

Buildings : The arrangement is the same as in the large Belzig Sanatorium, but on a smaller scale. There is a large vestibule next the entrance, leading to a day room and rest-shelters on the south side, and to the dining-room on the north. This communicates with the kitchen of the other sanatorium by an underground passage. The wards are all on the south side ; most are for one or two beds ; a few for more. There is a writing-room on the first floor ; bath and douche rooms for men and women respectively on ground floor and first floors. The consulting rooms are on the south side of the first floor. *Heating* by hot-water pipes. *Lighting* by electricity.

THE CHILDREN'S SANATORIUM

lies to the west of the Kirchenforst Sanatorium.

Building : Consists of a central portion of three stories in centre, one story at sides, and of two wings which project so as partially to enclose a rectangular space. Under the whole building are cellars. The ground floor has in the centre the dining-room and entrance hall with cloak-rooms ; and next to these on either side a large day room and large lavatories. In the wings are the

dormitories, and at the junction with the central portion the sisters' rooms with bathrooms behind. The wings also project northwards, to accommodate the ward kitchen, scullery and closets. In front of the central portion are the rest-shelters, so that the sister can overlook both these and the dormitories. On the upper floor of the central portion are the doctor's quarters, and a sister's room to the south, the examination room and a bathroom for matron and doctor to the north. In the roof are two isolation rooms each with two beds and a verandah, and to the north a staff bedroom and bathroom. One side of the building is for boys, the other for girls; there are two separate playgrounds, as well as separate arrangements for sleeping, lavatories, baths, etc. The dining-room and serving-room are connected by an underground passage with the Bleichröder Sanatorium and the kitchen of the chief sanatorium which supplies the food. In the lavatories each child has its own basin, brushes, soap and towel. The water is mixed to the right heat by the sister. In the same room is a closet for each child for clothes and dirty linen. In the dormitories the pedestals are of iron covered with linoleum. Dirty linen from each floor goes through shafts to the cellar, and thence to the laundry. The floors are covered with linoleum over cement; in the bathroom they are tiled. The lower part of the walls is painted in oil, the upper part colour-washed. Every window has a fanlight over it. In the rest-shelters are cane lounges with hair mattresses and special blanket sacks to take in the whole body of the child. *Heating* by hot-water pipes. *Lighting* by electricity.

Cost: 22,000 marks for thirty beds.

REFERENCE.—"Z. Tub.," 1903, v. i. p. 56.

THE KOLKWITZ SANATORIUM,

chiefly intended for the clients of the Brandenburg Insurance Company, is *situated* in the midst of an industrial district, 10 kilometres from Kottbus, in a pine wood belonging to the town. *Soil*: Quartz sand to a considerable depth. *Altitude*: 80 metres. *Grounds*: 40 acres.

Buildings: A main building, engine-house and laundry with disinfector, stables and ice-house, summer houses, etc. The main

building is solidly built and consists of three floors and attics. The south front has two wings at an obtuse angle with the centre, separated by two slightly projecting towers, and continued by the rest-shelters. At the end of these are separate villas for the medical director and inspector. The wards are all to the south in single row, and have one to six beds apiece ; cubic air space 36 to 40 cubic metres ; fifty-six in single-bedded rooms ; height 4·28 metres. The six-bedded wards are not used for patients with expectoration. On each floor is a nurse's bedroom connected by electric bell and telephone with the wards, etc. The doors, beds, couches, pedestals, are all of lacquered iron ; the walls are all painted to 2 metres high. Window space allowed is one-fourth of the floor space ; fanlights are provided over the casements. The upper panes are of ground glass ; wooden sun-blinds are placed outside. The floors and stairs are covered with linoleum, except in corridors, W.C.'s and bath-rooms, where terrazzo is used. All corners are rounded. A special electrical ventilator brings filtered air from without into cold chambers in the basement, whence it passes to heating chambers and is moistened and distributed by shafts. Other shafts carry off the foul air. *Heating* is by warm-water pipes in the wards, elsewhere by low-pressure steam ; smooth radiators being attached. *Lighting* is by electricity from their own supply. On the ground floor of the main block are the consulting rooms, office, rooms for the nurses and two large day rooms in the wings. Closets, common lavatories and rooms for brushing clothes with corresponding balconies are to the north of the corridors. Each patient has her own locker for clothes, etc., her own place and utensils in the lavatories, and her own locker in the boot room ; also her own serviette holder of papier-maché stamped with a hot iron with her own name. United to the main block by the grand staircase to the north are two structures : on one side the chapel, over the douche and bath-rooms, on the other the dining-room with kitchen department under it. A winding staircase in one of the towers unites the latter.

THE BEELITZ SANATORIA,

which belong to the Berlin Insurance Company, probably constitute the largest institution of the kind in the world, comprising 845 beds

for tuberculous and about 400 for non-tuberculous patients. The administrative portions have been built with a view to further extension up to a total of 1800 beds.

Situation : 50 kilometres south-west of Berlin. *Station* : Beelitz Heilstätten-i.-Mark. *Soil* : Sandy. *Altitude* : 65 metres. *Grounds* : 140 hectares, partly covered with pinewoods, divided into an eastern and a western portion by the main road from Berlin, and in the opposite direction by the Berlin Wetzlar Railway. The northern sections are devoted to the tuberculous cases, women occupying the western, men the eastern sections. Each section is to some extent independent, but there is a central power-station common to all, supplying steam, water and electricity. The tuberculosis sanatoria are called "Heilstätten," whereas the institutions for non-tuberculous patients are called "Sanatoria," in the official descriptions.

The Men's Tuberculosis Sanatorium

consists of an old and a new pavilion, the former of two stories (186 beds) erected in 1902, the latter of three stories (294 beds) erected 1905-7. Each building has northward projecting wings at the ends, and a central northward projection, containing baths, lavatories, W.C.'s, the main staircases, cloakrooms, and rooms for electrical treatment, massage, and sterilization. The dining-room is in the western wing on the ground floor, together with several day-rooms. The wards contain from two to four beds, with 9 square metres space per patient, and 38 cubic metres. Floors are of oak parquet laid on asphalt, with rounded angles made of torgament, walls oil painted below, double windows in four pieces and warm-water pipes. The corridors and day-rooms have mostly tiled floors, and are heated by low-pressure steam pipes. There are verandahs with removable roofs near the dining-room, and protected spaces on three sides of the central northern projection for use in bad weather. The lower floors contain the wards, the attics consisting partly of staff-rooms, partly rooms for summer patients. The furniture consists of an iron bedstead, chair, bed-table and locker.

On each floor is a disinfecter for clothes, which are introduced in one room and removed in another. In the new pavilion the corridors are laid with linoleum, as being less noisy than tiles; the

radiators and hot pipes stand 5 cm. away from the walls; and there is an electric passenger lift capable of taking beds. There are also isolation rooms for infectious diseases. There are seven rest-shelters for the men.

The Women's Tuberculosis Sanatorium

also consists of an older and a newer pavilion, the former with seventy-three beds, the latter with 273, arranged like the corresponding men's pavilions. In the older pavilion the dining-room is in the east wing, and the common rooms are somewhat smaller than in the men's buildings, to correspond with the smaller number of beds. There are ten rest-shelters for the women.

Staff and Administrative Buildings: Separate villas are provided for the chief medical officers of the tuberculosis sanatorium, and for the one for non-tuberculous diseases; for the unmarried doctors; and five for the lay staff.

Lodges for the men's and women's portions; workshop, disinfecter and laundry, engine-house, baking-house, slaughter-house, cellars for potatoes, vegetables, wine and beer, etc. Of these the engine-house, baking, slaughter-houses and disinfecter are on the men's side, the kitchens and laundry on the women's side. High-pressure steam (8 atm.) is sent from the power-station in underground passages to the different buildings, and transformed where necessary into low-pressure steam or hot water.

Staff: The whole establishment includes eighteen doctors, twelve inspectors, twenty-one sisters and nurses, thirty-six waiters, ninety-two servants in the kitchen and laundry, 130 in the engine-house, workshops and gardens, 100 in the separate staff villas, and over thirty elsewhere.

Cost: Of the older pavilion for men, 1,269,700 marks, or 6830 per bed; the newer 1,668,000 marks, or 5670 per bed; the cost of the older pavilion for women being 6830 marks per bed, of the newer 5812. The total cost has amounted to more than 9,000,000 marks. The cost of maintenance has been 5'60 marks per head per day.

Admissions in 1910: 2031 men, 1373 women.

Average length of stay: Seventy to seventy-five days.

2. BRANDENBURG HOMES FOR ADVANCED CASES.

The Malchow, Blankenfelde, and Buch Homes are near Berlin, the Schöneberg Home near Frankfort-on-the-Oder. The Malchow Home is in the outskirts of Berlin, on sandy soil in the midst of meadows and irrigation fields. Blankenfelde Home was originally a lying-in institution, converted into a women's sanatorium for tuberculin treatment in 1892. It receives patients with various forms of chest disease.

3. POMERANIA.

The Kolberg Forest Home is really a convalescent home for children, open during the summer.

4. THE HAMBURG DISTRICT.

THE EDMUNDSTHAL SANATORIUM FOR MEN,

Geesthacht, is intended for the uninsured of the city of Hamburg. It is *situated* about three hours' journey by steamboat from Hamburg, in a little pine-wood overlooking the River Elbe, sheltered on three sides by wooded hills. *Altitude*: 30 metres above sea level. *Station*: Bergedorf.

Buildings consist of a main block, engine-house, doctor's house and outbuildings. The main block is T shaped, the top of the T facing south, and has a basement with two upper stories. The whole of the southern portion consists of wards, as well as the ends of the northern pavilion, the connecting piece consisting of kitchen department below, and dining-hall above. In the basement of the southern building are baths and lavatories. Adjoining the wards are wide corridors which form day rooms; and outside these are verandahs. Four large wards contain twenty beds apiece. These wards are each divided into five divisions by partition reaching half-way to the ceiling. Four smaller rooms contain each four beds, besides which there are seven single-bedded rooms. All but three of the latter are on the south side. *Heating* is by low-pressure steam; *lighting* by electricity. Hot and cold water are everywhere laid on.

THE EDMUNDSTHAL SANATORIUM FOR WOMEN

is also for the uninsured of the city of Hamburg, and is *situated* near the foregoing institution.

5. SCHLESWIG-HOLSTEIN.

The institutions for the tuberculous in this district are not strictly speaking sanatoria for consumptives.

CHAPTER LVII.

SANATORIA IN CENTRAL GERMANY.

COMPRISING Oldenburg, Hanover, Brunswick, Saxony and adjacent parts, including the Harz Mountains.

There are forty-six sanatoria in this part of Germany, with 3136 beds. Four are full-price sanatoria, with ninety-six beds. There are in addition fifteen low-price sanatoria for the middle classes, with 530 beds, and sections for the middle classes in two other sanatoria primarily intended for the working classes. There is only one small Children's Sanatorium; but six other sanatoria receive children as well as adults. One institution, with 204 beds, receives patients in all stages.

Name and Locality.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Age and Sex.	Beds.
OLDENBURG—						
St. Marienstift, Neuenkirchen	1905	Dr. Heuer	W.	3'25-5'50	m., w.	52
Gr. Herz. Elisabeth San.	1908	Dr. Haedicke	W.	3'25-3'50	m., w.	75
HANOVER—						
Dr. Michaelis San., Rehburg	1886	—	M.	7-8'50	m., w.	30 ¹
Bremen San., „	1892	—	W.	2-3	w.	30
Royal Cloister San., „	1902	Dr. Müller	M.	4'50	m., w.	42
Hanover San., „	1904	„ (Ins.)	W.	—	m.	24
Oderberg San., Gebhardsheim	1897	Dr. Billig (Ins.)	W.	—	m.	180
Glückauf San., St. Andreasberg	1899	Dr. Pingel	W.	—	w.	100
Andreasheim Conv. Home	1903	—	W.	3'50	w.	43
Villa Auguste St. Andreasberg	1898	Dr. Jacobasch	M.	4'50-6'0	w., ch.	25
Sister Dietrich's Conv. Home	1902	—	M.	3'50-5'50	m., w.	12
Steierberg San., Sülzhayn	1898	Dr. Kremser	W.	„	m.	130
Fernsicht „ „	1898	„	M.	8-12	m., w.	20
Waldhaus „ „	—	Dr. Wiemann	M.	5-7'50	m., w.	46

¹ Twenty in winter.
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Name and Locality.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Age and Sex.	Beds.
HANOVER cont.—						
Kurhaus San., Sülzhayn	—	Dr. Wiemann	M.	6-8	m., w.	45
L. Schäfer's Nursing H. Sülzhayn	—	"	M.	5	m.	13
Waldpark San., "	—	Dr. Schleisick	M.	5'50-7'50	m., w.	28
Sonnenfels " "	—	"	M.	5'50-8'0	m., w.	31
Otto Stubbe " "	—	Dr. Lützow	M.	5'50-7'50	m., w.	25
" working cl., Sülzhayn	—	"	W.	—	m., w.	40
Hohentanneck San., Sülzhayn	—	Dr. Stein	M.	6'50-8'0	m., w.	29
Erholung San., "	—	"	M.	5'50-7'50	m., w.	32
Glückauf " "	—	Dr. Wiemann	W.	5-6'50	m., w., ch.	26
Königsberg Conv. Home Goslar	1895	Dr. Andrae (Ins.)	W.	—	m.	70
Erbprinzentanne Conv. Home, Zellerfeld	1898	Dr. Wegener (Ins.)	W.	Ins.	w.	63
Schwarzenbach Conv. H.	1899	Dr. Wigand (Ins.)	W.	Ins.	m.	70
Stübeckshorn Conv. H., Soltau	1902	Dr. Büttner (Ins.)	W.	—	m.	65
Army Lazaret Hann, Münden	1907	Dr. Lobedank	—	—	m.	10
Heidehaus H. for Cons.	1907	Dr. Ziegler (adv.)	W.	1'50-4'50	m., w., ch.	204
BRUNSWICK—						
Albrechtshaus San., Stiege	1897	Dr. Kohler (Ins.)	W.	2	m.	65
Marienheim San., "	1899	" "	W.	2'50	w.	34
KINGDOM OF SAXONY—						
Reiboldsgrün San.	1873	Drs. Wolff, Salzmann	M.	8-12	m., w.	140
" 2nd class	—	" "	M.	6-7'50	m., w.	
Albertsberg San., Auerbach	1897	Dr. Schneider	W.	3-3'50	m.	146 ¹
Carolagrün San., "	1900	Dr. Gebser	W.	3-3'50	w., ch.	145
Leipzig San., Adorf	1906	Dr. Thiemer	W.	3'50-4'25 ²	m.	92
Hohwald " Neustadt	1905	Dr. Schultze	W.	—	m.	260
Dr. Nöhring's San., Neu Coswig	1905	Dr. Nöhring	M.	12-15	m., w., ch.	24
PROVINCE OF SAXONY—						
Vogelsang San.	1899	Dr. Schudt	W.	3'75	w.	200
" Private Sect.	—	"	M.	5'50-6'50	w.	
Sorge San.	1902	Dr. Pigger	M.	3'50-5'50	w.	72
Lostau San.	1902	Dr. Siebke	W.	3'75-4'50	m.	105 ³
Frauenhilfe San., Aschersleben	1903	Dr. Heynacker, Dr. Rosenthal	W.	Free	b., g.	13
ANHALT, DETTMOLD, MEININGEN AND WEIMAR—						
Schielo San.	1905	Dr. Petzold (Ins.)	W.	—	m.	140
Herzogin Marie San.	1906	Dr. Voigtländer	W.	3'50-5'50	w.	17
" " "	1906	"	W.	2'25-2'50	ch.	63
Army Lazaret, Dettmold	1904	Dr. Drenkhahn	—	—	m.	12
Römhild San.	1902	Dr. Servaes (Ins.)	W.	3'70	w.	80
Sophienheilstätte, Berka	1898	Dr. Koppert "	W.	3'70	m.	140 ⁴
Blankenhain San.	1885	Dr. Silberstein	M.	10-12	m., w.	12

¹ One hundred and twenty-six in winter.² Sustentation fund for those without means.³ One hundred in winter.⁴ Ninety-five in winter.

Hanover. The Rehburg Sanatoria.

In travelling southwards from Hamburg or Bremen, through the North German plain, a range of hills is met with to the west of Hanover, which at once attracts attention by its beautifully wooded and diversified scenery. It is about six miles long, with a direction from south-east to north-west, and rises in parts to a height of nearly 500 feet above the sea level. Near it, to the north-east, is the Steinhuder Lake; while the city of Hanover is some twenty-five miles to the east. The ridge is part of an ear-shaped patch of wealden strata, isolated in the alluvial plain. Its western slope is gentle, and is covered with conifers, oaks and other trees; on the eastern slope, which is more abrupt, beeches predominate. It is in a deep notch of this eastern side that the village of Bad Rehburg is situated, well known for its mineral springs and bathing establishments, and for its "whey cure" in summer. The bathing establishment and much of the surrounding country are in the hands of Government. The village consists of a few wide streets of unpretentious houses, and of two main avenues at right angles to one another, overshadowed by beautiful trees, and lined with scattered country villas and rural hotels, each with its own patch of garden. The climate is a warm and moderately moist valley climate, chiefly remarkable for its freshness in summer, and for the absence of strong wind. The chief visiting season has for many years been from May to mid-September; but more recently the place began to be visited in winter also by consumptive patients; and when Brehmer's example led to the erection of so many sanatoria in Germany for the fresh-air treatment, several were opened at Rehburg, one being for the poor of Bremen.

THE REHBURG SANATORIUM,

which owes its existence to Dr. Michaelis, one of the pioneers of the sanatorium treatment in Germany, is *situated* in the upper part of the village, surrounded on three sides by public woods, which cover over 300 acres of ground. *Altitude*: 90 metres. *Grounds*: three acres, containing some lofty and beautiful beech-trees.

Buildings: The sanatorium consists of a three-story building,

with a few attics in the peak of the roof, and verandahs to the south and east. It has a southerly aspect, and the rooms are so arranged as to admit sunshine into every one. The centre of the building projects in a series of open balconies and fresh-air shelters, each of which stands a little farther out than the one above. The rooms behind these are well lighted by windows in other directions. There are a few common rooms, the dining-saloon having a capacity of about 1000 cubic metres. The bedrooms, which are twenty in number, vary in size from 50 to 100 cubic metres. They have linoleum-covered floors, whereas in the common rooms there is parquet. The walls are covered with shiny washable paper, and the furniture is also for the most part readily cleansable. The *heating* is by low-pressure steam; the *lighting* was by naphthalene lamps; but it was proposed to introduce acetylene, unless a public supply of electricity were provided. There is a separate annexe for summer use.

THE BREMEN SANATORIUM

was erected mainly at the instigation of Dr. Michaelis, being the third working-class sanatorium opened in Germany.

Situation: A little to the north of the Royal Bathing Establishment, in a very sheltered situation on a hillside. Close by are cornfields; a small garden lies to the south, and densely wooded hills protect it to the north and west, and the tall beech-trees of Bad Rehburg to the east.

The *building* consists of a centre and two wings, which form a nearly unbroken line facing south. In the centre are a dining-room, day-room, doctor's room and matron's room, and in the projecting bow a room with four beds. The east wing contains two large rooms with four beds each, and two smaller with two beds each, and under the roof another room with two beds. The west wing has two rooms with four beds each, and two rooms with two each. The rooms are four metres high, the larger being 7×9 metres, the smaller $3\frac{1}{2} \times 7$ metres. The walls are colour-washed; and in the dining-room there is also linoleum to the height of the shoulders. Floors are everywhere covered with linoleum, which is daily cleansed with damp cloths. The place was beautifully clean

when I visited it, simple, homely and practical. The *heating* is by means of close (Lönhold) stoves; the *lighting* with petroleum. The furniture is simple; bedsteads of iron, with spring and horse-hair mattresses.

THE ROYAL CLOISTER SANATORIUM

is intended for teachers, clergymen and officials of small means.

THE ST. ANDREASBERG GROUP OF SANATORIA.

St. Andreasberg is a small town of nearly 4000 inhabitants, with a visiting population of nearly as many more, who come to the place chiefly for hydropathic treatment or for change of air. It is situated partly on the side of a long hill, and partly in some of the adjacent valleys. It is said to be the most elevated town in Northern and Central Germany, and has long been known as a cool summer resort. Mining operations are carried on in some of the neighbouring valleys, but there are no large factories to sully the purity of the air. The place has two hydropathic establishments, and several hundred lodging-houses, besides half a dozen hotels, a concert hall and theatre, and a "Kurpark". Electric lighting and electric trams are, it is said, to be introduced before long; but with all this, it remains a quiet and unpretentious town. The surrounding country is exceedingly varied and picturesque, with open moorland in some directions, and pine-clad mountains with deeply cleft valleys in others. St. Andreasberg is the terminus of a small branch railway from Scharzfeld, on the line from Nordhausen to Northeim, about four and a half hours' rail from Hanover. In this neighbourhood are the Oderberg, the Glückauf, and the Felixstift Sanatoria, and a few other smaller establishments.

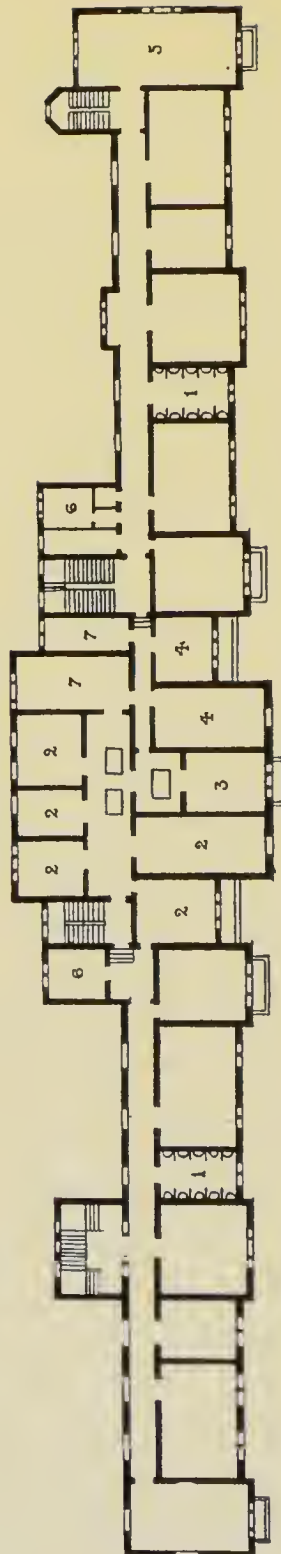
ODERBERG SANATORIUM

is *situated* between St. Andreasberg and Oderhaus, on the south side of the Oderberg, protected to the north by rising ground covered with woodland; and to the west, and partially to the east, by outstanding thickly wooded spurs of the Oderberg. To the south is falling ground, partly meadow, partly woodland. *Altitude*: 640





2ND FLOOR



1ST FLOOR

FIG. 27.—ODERBERG SANATORIUM

metres. *Grounds*: Very small; but there is plenty of open land around it, and patients can use the public pine-woods near by.

Buildings: The sanatorium consists of a main building, doctor's house, disinfection house, sundry stables and cow-sheds, and two cottages for some of the servants. The main building, which has a due south front, and is built of wood on a solid basement, consists of a central block and two wings, with boiler and engine-house at one end, all arranged in a long line of 102 metres about 90 from the main road behind. Owing to the fall of the ground, the basement is above-ground in front. It contains the kitchen, scullery, bath- and douche-rooms, cellars and store-rooms, some of the ventilating machinery, and the workshop for repairs, and has in front of it a fresh-air gallery with diverging ends (see figs. 26, 27). The ground floor has in the centre the common dining-room, with the inspector's consulting-rooms behind, and on either side patients' bedrooms, which all have a southerly aspect. There are also in each wing a lavatory and a nurses' room, and at the eastern end a common room 28×13 metres ($92 \times 42\frac{1}{2}$ feet) in size. The next floor has in the centre the inspector's quarters, linen-rooms, and others for the committee of management; those in the wings resembling the rooms on the ground floor. Above this is an attic floor, of which the centre is occupied by bedrooms for the women servants, linen-rooms, etc., while the sides are like those on the lower floors, excepting that in place of the common room there are four isolation wards. These have no direct communication with the rest of the bedrooms, although they are approached by a passage from the common corridor. Each floor is served by a longitudinal corridor at the back. For security in case of fire, a massive wall with iron doors separates the western wing from the rest of the building. Of the bedrooms, seven are for one patient, fourteen for two, six for three or four, fourteen for four each. A few more can be accommodated in other rooms in case of need. The average cubic space per head is 35 cubic metres, the average floor area, 10 square metres, the height of the rooms being 3.80 metres. The walls are boarded and colour-washed; the floors of pinewood covered with linoleum, excepting in the kitchen and scullery, where there are tessellated pavement and partially tiled walls, and in the bathrooms, which have glazed tiles and a cement

floor. The rooms have double windows. The furniture is of lacquered wood or iron, free from unnecessary dust-retaining irregularities. The dining-tables are covered with American cloth, fastened with wooden fillets along the edges. The bedsteads are spring-bottomed iron ones; the mattresses are of horsehair in buttoned-up linen cases, with buttoned-up linen covers outside, and the same system is adopted for the pillows. The washstands and pedestals are of enamelled iron with glass tops. The lavatories on each floor have enamelled iron basins, with hot and cold water laid on, the plumbing resembling that of English lavatories.

The *heating* is by low-pressure steam; the *lighting* by electricity. Ventilating fans driven by electricity force a stream of air (which is warmed if necessary) into a long channel in the basement, which in turn supplies every room. In this way 80 cubic metres per head can be supplied every hour. Inlets exist in every room near the ceiling; outlets near the floor; these communicate with separate shafts and are covered with gratings. During the greater part of the year the incoming air comes through open windows; in very severe weather the windows are closed and warm air forced in by the ventilating machinery.

Adjoining the western wing is a boiler and engine-house, and next to it the accumulator room, with coal cellar and ashpit outside. The boiler and engine produce steam of 7 atm. pressure for the electromotor, reduced to 2 atm. for cooking and disinfection, and farther to $\frac{1}{10}$ atm. over-pressure for warming the building and incoming air, and for heating the water for baths and scullery. The closets are movable automatic earth closets, in a partially built out and well-ventilated pavilion to the north of the basement corridor.

The fresh-air gallery communicates directly with the bathrooms and with the staircase to the dining-saloon, and embraces, with its diverging ends, a sheltered gravelled recreation ground. It has places for sixty patients. The doctor's house is about forty yards to the south-east, so placed as to command the fresh-air gallery. The disinfection house, with mortuary and *post-mortem* room, is about fifty feet westward from the engine-house. The disinfector is double, with separate approaches for soiled and disinfected linen. Owing to the altitude, extra super-heating is necessary to ensure

disinfection. The stables, cowsheds, and houses for the servants are still farther off (100 to 150 yards) to the west, the latter being near the road.

The domestic staff, which is under an inspector, consists of twenty-five in all, and includes four male nurses (who also clean the rooms), a female cook and three kitchenmaids; a machine tender and his mate; a heater; a steward and his wife; coachman and messenger. Some of the lighter duties, such as the cleansing of the spitcups, are performed by the patients, an overman being chosen for every section of the building (each containing about twenty patients). He is responsible for the tidiness of the rooms, the daily removal of closet pails, and the cleanliness of the closet of his own section, of which he keeps the key; for the regular use of the thermometer, the proper conduct of his own set of patients, extinguishing of lights, observance of rules concerning books, and the like.

ANDREASHEIM SANATORIUM,

originally called the Felixstift, was erected by the late Dr. Ladendorf with the help of a legacy, and subsequently bought by the Hanover Insurance Company for its own clients. It is *situated* about half-an-hour's walk west of St. Andreasberg, on a steep hill-side, looking over meadows and a little stream to a pine-clad hill. Protected on all sides from cutting winds, the most distant view being to the south-west.

The building is a pretty structure in Swiss style, built of wood on a granite foundation, with red-tiled roof. It consists of a raised centre and two wings. In the western wing on the ground floor is a large dining-saloon, with a small serving-room to the north, a large window on the western side, and a large covered projecting balcony on the southern front. In the centre of the south side is the entrance hall with office and matron's and consulting rooms; and behind it the staircase. The rest of the ground floor and first floor is taken up with patients' rooms, some of which can be used as sitting-rooms if necessary. The centre has a few attics in the peak of the roof. The basement, which is level with the ground in front, contains a light and cheerful kitchen in the left wing, with a small

scullery, and near them a bathroom and douche-room, the larder, and various store-rooms, together with the heating apparatus. The bedrooms, some of which have small balconies, are cheerful and airy, the walls painted, the wooden floor oiled and provided with a strip of carpet near each bed. The rooms are ventilated partly by means of open windows, which are in three parts, independently movable; partly by warm-air inlets near the floor and outlets near the ceiling which lead into separate shafts. There are two to three beds in most rooms, a few being single-bedded. *Heating* by low-pressure steam. *Lighting* by petroleum lamps.

THE SÜLZHAYN SANATORIA.

In the southern part of the Harz, where the land begins to fall towards Göttingen and Nordhausen, is a little niche in the mountain side overlooking the village of Sülzhayn. Densely wooded slopes rise up on three sides, forming a sort of amphitheatre, near the centre of which, on a precipitous rock, has been built the private sanatorium "Fernsicht," by the side of the Steierberg Folk Sanatorium. The foundations of this imposing structure have been built up on massive stone pillars eighteen metres high, additional room being obtained by blasting the rock behind. On this artificial platform have been erected three buildings: the private sanatorium, the doctor's residence, and the people's sanatorium. In such a situation there is almost perfect shelter against boisterous wind from the colder quarters; while a lovely view is obtained of the country to the south. In the village of Sülzhayn are a number of private sanatoria.

THE SÜLZHAYN STEIERBERG SANATORIUM

was built by the North German Trades Union Benefit Society, Halle-on-Saale, for its own members, chiefly miners. *Stations*: Ellrich, Beneckenstein. *Soil*: Porphyry and grauwacke (the latter used in building the sanatorium). *Altitude*: 450 metres. *Grounds*: Nearly 14 hectares, mostly woodland, on the mountain side.

The building is planned somewhat like the one at Ruppertshain, with a concave front, a centre and two wings. The dining-saloon is, however, placed behind the centre on the first floor, and communi-

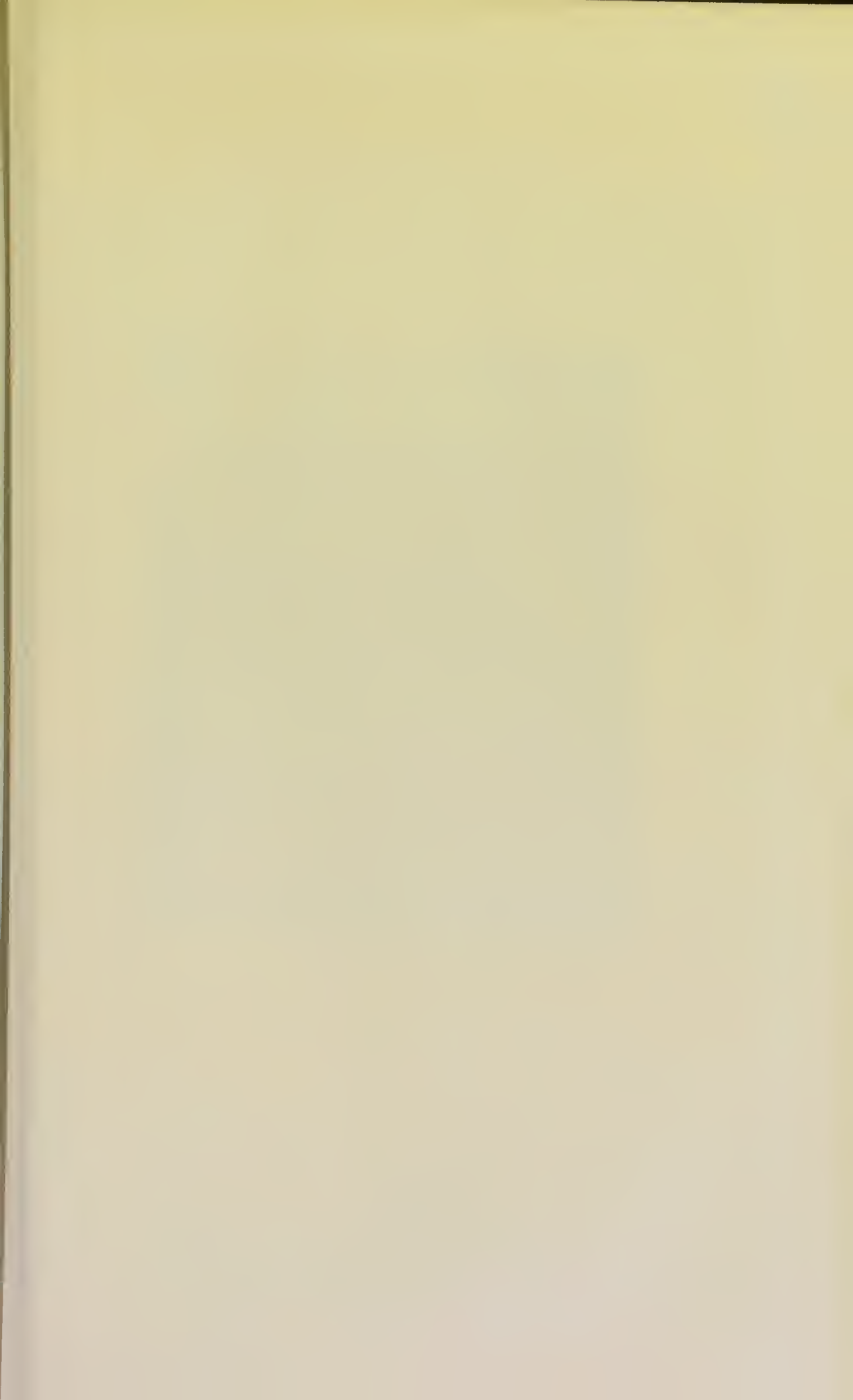
cates by a bridge with the kitchen block still farther to the north. The patients' bedrooms, which are placed in a single row on the south side, on three separate floors, contain from one to four beds apiece, with an allowance of forty-two cubic metres per head, and a height of four metres. The floors are made of *torgament*, a patent material consisting of wood shavings incorporated with cement, which is capable of uniting with stone, iron or woodwork, and is warmer to the feet than ordinary cement. The walls are of colour-washed plaster of Paris, the doors of wood without projections and very carefully fitted. The windows are large, but have not been carried up to the ceiling. Throughout the sanatorium all angles are rounded and surfaces smooth. Running in front of the centre block on the basement, which on the south side is on the ground level, is a corridor four metres wide, which can be heated, and serves as a promenade in bad weather. It has very large windows which open out on to a covered strip of garden, and boot rooms on either side. The corresponding parts on the ground floor form a large day room and a fresh-air gallery, five metres wide, to be used for rest in the open air, and protected by the balcony overhead. In both the centre and the wings balconies are placed in front of the bedrooms. The lavatories, water-closets, rooms for the nurses, and staircases are at the back of each wing beyond the corridor. There are two water-closets in each wing on each floor. The water-closet basins cover themselves automatically. Next the water-closets are rooms for disposing of the sputa, etc. In one compartment is a boiler for boiling the sputum, after which it goes down a special soil pipe into the drain. In another compartment the spitcups are boiled and the chamber pots cleaned. The common bathrooms and lavatories, which are also to the north, have terrazzo floors covered with parallel wooden laths. Each patient has his own china basin fixed to the wall, with a box for toothbrush, etc.; on one side of the lavatory there is only cold water; on the other hot and cold. The douche-rooms, with doctor's room and dressing-room, are in the wings on the ground floor, and have the usual arrangement of taps and thermometers to indicate the temperature of the douche. Underneath are the boiler for disinfection of sputum, the inhalation room, and some cellars. There are also a dark room for photo-

graphy and a library. Each wing has also a lavatory for the nurses, and a small store-room; and on the lower floors a common room for the patients.

Behind the centre is the administrative block. This has in the basement the accumulator-room and coal-cellar, with the ice-cellar on one side and the three heating furnaces on the other. Above these come the laboratory and consulting-room, the porter's room and office, on each side of the entrance. On the next floor is the large dining-saloon, with a room for the sisters on one side and a couple of committee rooms on the other. This communicates with the kitchen block by means of a serving-room on the bridge. The kitchen block, which has its entrance behind, contains in the basement the larders, store-rooms, cellars and engine-room. There is also a passage under the road to the main block. On the ground floor is the laundry department with disinfecting apparatus and linen-rooms on either side. The disinfector has two approaches; the linen-rooms are for storing and mending respectively. The laundry has an electric mangle, and rolling and ironing rooms. An electric lift carries the washed linen up to the drying-loft. Above the laundry department is the kitchen department, with scullery, crockery-room, vegetable-kitchen, and dining-room for the servants. The kitchen is separated from the serving-room by a passage, and has a special ventilating shaft. On the next floor are the quarters of the engineer and his wife, together with a separate portion for the women servants and a drying-loft. The kitchen department has its own staircase, douche and bathrooms, and water-closets.

The sisters are lodged in separate quarters in the roof of the main building. The sanatorium is *heated* by low-pressure steam-pipes, and by closed stoves in addition. It is *lighted* by electricity.

The chief medical officer has under him a matron and female nursing staff. The assistant medical officer is also appointed on his recommendation, subject to the assent of the matron. All the other officials are directly appointed by the chief medical officer. They consist of an engineer, female cook, two kitchen maids, two male nurses, messenger and night watchman. No inspector has been appointed. The male nurses clean the spitcups. The building is cleaned daily by women from the village.



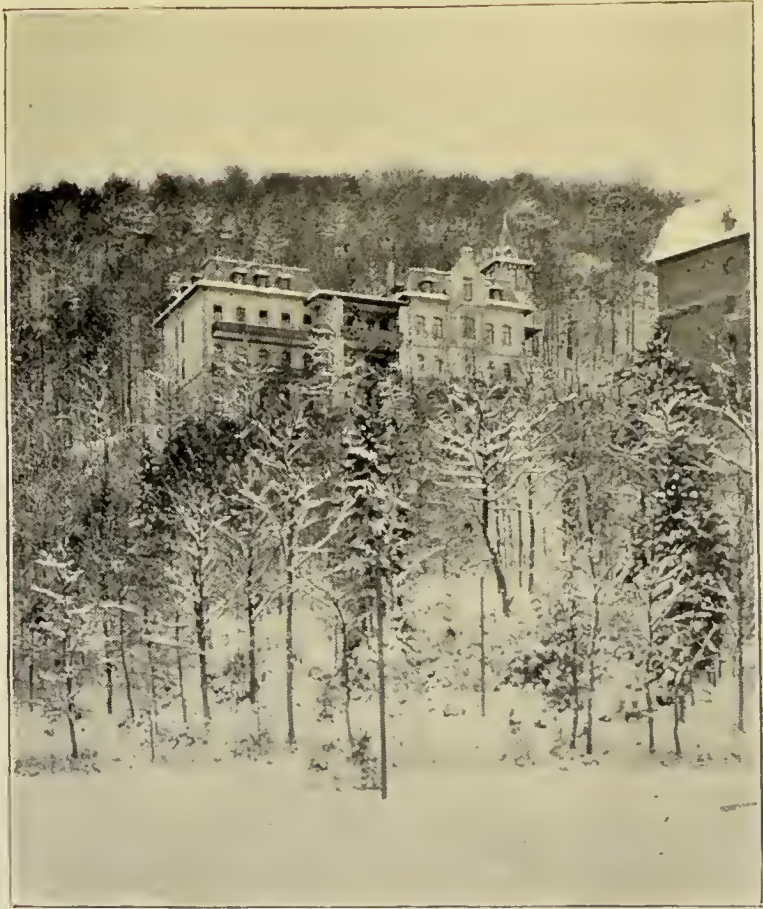


FIG. 28.—FERNSICHT SANATORIUM, SULZHAYN

[Face page 359

THE FERNSICHT SANATORIUM

lies to the west of the miners' sanatorium, and is attached to Dr. Kremser's residence, which is between them. Owing to the rapid fall of the ground it has a deep basement which is above ground on the south side, whereas the doctor's villa has one floor less. There is accommodation for ten patients on the ground and first floors, all being to the south and provided with balconies. Between the two buildings is a deep fresh-air gallery on each of these floors. The basement contains in front a reading-room and billiard-room, and behind a bathroom and consulting-room. Over the latter on the two upper floors are bathrooms and lavatories, together with rooms for the attendants. The south-eastern corner is occupied by the furnace room, above which is the kitchen, and above this the dining-saloon, with a large winter garden in front of it (fig. 28). Only slight cases are admitted.

THE EASTERN HARZ MOUNTAIN GROUP.

THE KÖNIGSBERG CONVALESCENT HOME

was acquired by the Hanover Insurance Company for its own clients.

It is *situated* in the northern part of the Harz district, in the midst of pine-woods, at an *altitude* of 450 metres. Originally a private house, it was used for a time as a convalescent home, being converted later on into a sanatorium by the addition of Döcker chalets, etc. It is managed by a nursing sister.

THE ERBPRINZENTANNE CONVALESCENT HOME

was similarly acquired and altered by the same company. It is *situated* in one of the most elevated and open parts of the Harz district. Leaving Goslar by rail the train goes panting and puffing up a steep incline, through a winding river valley skirted by dense pine-woods, until it reaches the bare and open mining country near Clausthal. Adjoining this important mining village is the more purely residential village of Zellerfeld, which climbs the hillside on the way to an elevated plateau consisting chiefly of meadows and

cultivated land. About a mile from the village, near a small lake and stream, is a pine-wood, by the side of which the sanatorium stands. It was originally a restaurant and brewery, and is next the main road, opposite a village inn. There are no other buildings near it. The *soil* is of sand or rock. *Altitude*: 550 metres. *Grounds*: $5\frac{1}{2}$ hectares, mostly woodland. *Station*: Clausthal, Zellerfeld.

Buildings: An old wooden structure and a brick built house, to which have been added a new one of timber and plaster on a brick foundation, and some stables, together forming three sides of a square.

THE SCHWARZENBACH CONVALESCENT HOME

belongs to the same company. It was originally an institution for nervous diseases. *Altitude*: 576 metres.

STÜBECKSHORN CONVALESCENT HOME

also belongs to the Hanover Insurance Company. *Station*: Emmingen.

THE BRUNSWICK SANATORIA.

THE ALBRECHTSHAUS

belongs to the Brunswick Insurance Company.

Situation: A mile or two from the little village of Stiege, on a slope with meadow-land in front, surrounded by pine-clad hills. *Altitude*: 500 metres. *Station*: A halt on the light railway from Gernroda to Hasselfelde.

Buildings: A wooden structure on granite foundations and basement, shaped like the letter **E**. Behind the centre is the entrance, with the staircase and kitchen department around it. The kitchen, which has a tiled roof and floor, is supplied with hot cupboard, food lift, a central stove, etc., and has next to it a scullery and small store-room. Above it on the first floor are the quarters of the house master, and above these a few garret rooms for women servants. Also in the centre, but on the south side, are the dining-

saloon on the ground floor, with a verandah in front of it, and two day rooms on the first floor, both of the latter provided with spacious balconies. Above these, in the peak of the roof, is a drying space. The lateral parts of the central block have a single row of rooms on the south side with a corridor behind. They comprise on the ground floor two bathrooms, two lavatories, the cook's bedroom, the office, consulting-room, two patients' bedrooms each with four beds, and one with two. On the first floor are four rooms with four beds each, two with two beds apiece, a lavatory and room for the chaplain. In the wings on the ground floor are two large dormitories for ten patients each, which, however, owing to pressure on space, have been made to accommodate fourteen apiece. In the lavatories each patient has his own basin and utensils. Under the large dormitories are the chapel in the eastern wing, a gymnasium in the western. The rest of the basement is occupied by heating apparatus and cellars. The patients' bedrooms have a *cubic space* per head of twenty-seven to twenty-eight cubic metres. The windows are large, of the usual pattern with three sections, and a ventilator is present in each room. The walls are of rough plaster on the lower floor, oil-painted in the upper floor and the lavatories. The floors are of cement in the basement corridor, tiled in the ground-floor corridor, elsewhere covered with linoleum. Most of the rooms are heated by closed stoves burning wood; but three rooms, including a bath- and douche-room, are heated by steam-pipes. The *lighting* is by petroleum. The closets are built out on the north side of the corridors. They are six in number and are earth closets, the user distributing peat mould with a spade. In front of the building is a fresh-air gallery, the roof and overhanging front of which are formed by a roller blind of sail cloth, the floor consisting of the pebble-covered terrace. A *Döckersche Baracke* in the garden serves as a recreation pavilion. Behind the main building, across the courtyard, are stables, steam disinfecter, etc.

The domestic *staff* are nine in all, including the steward.

MARIENHEIM

is the sister institution to the above, *situated* in an adjoining wood.

Saxony.

THE REIBOLDSGRÜN GROUP OF SANATORIA.

Several sanatoria have been built on the lower slopes of the Erzgebirge. These mountains, which form the natural boundary between Saxony and Bohemia, and reach an altitude of 750 to 800 metres with a few peaks of 1200 metres, consist of a number of parallel chains separated by valleys, each containing a tributary of the Elbe. The *soil* is permeable and mostly volcanic or of hard rocks.

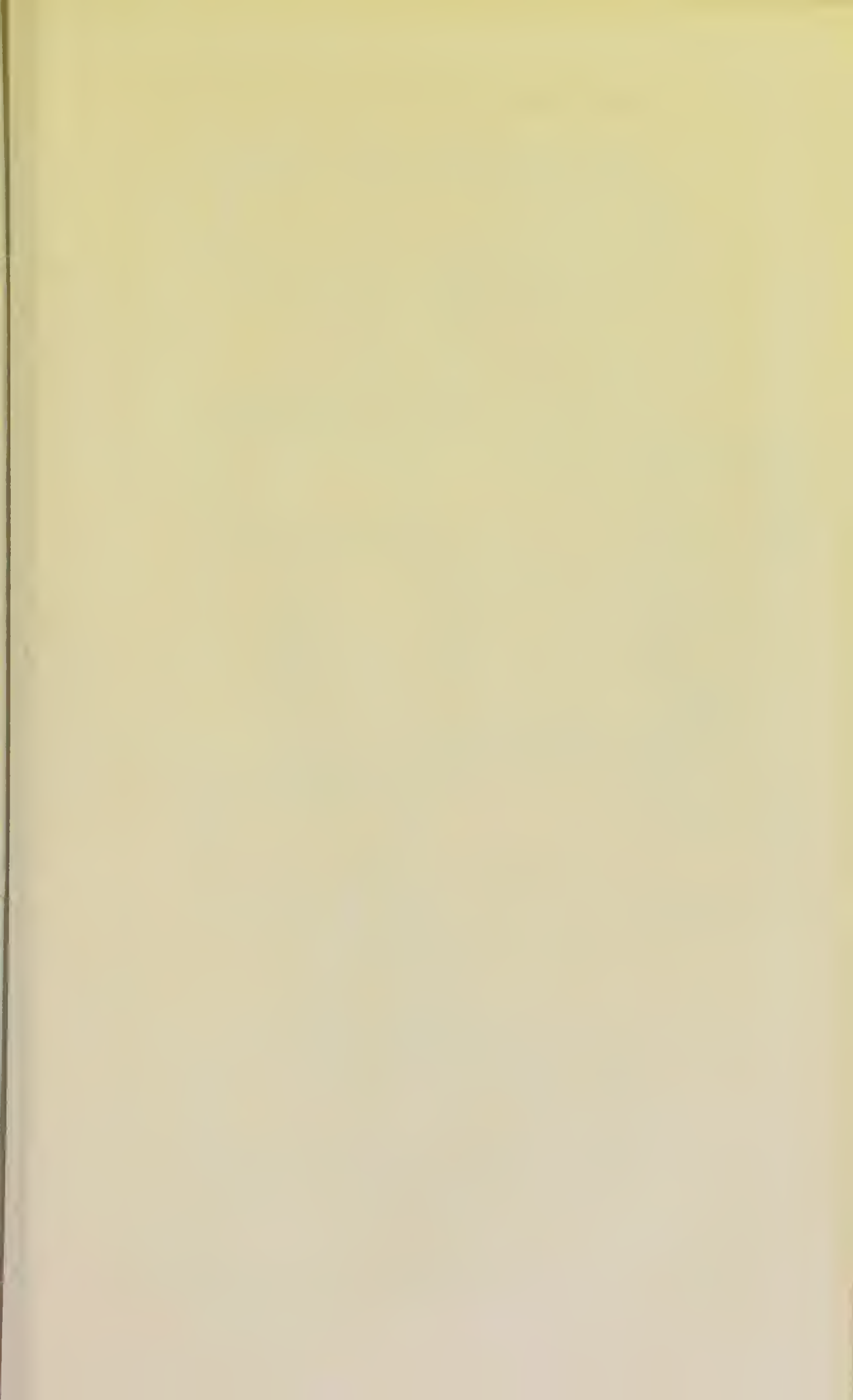
The earliest of these sanatoria was the Reiboldsgrün Sanatorium founded by Dr. Driver for private patients. Two others have been erected later for the insured classes.

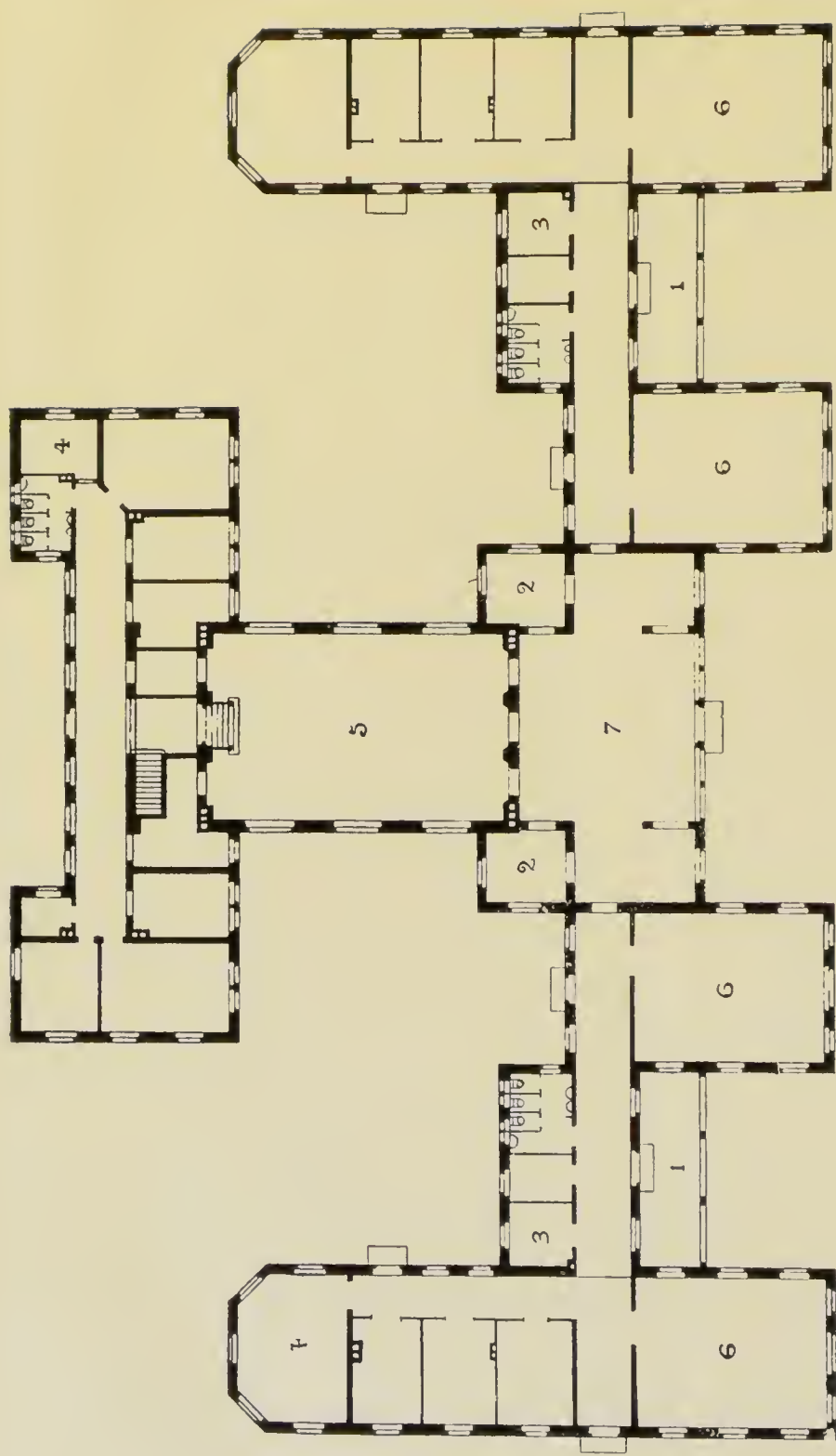
THE REIBOLDSGRÜN SANATORIUM

is *situated* in the valley of the Zinsbach, in the midst of a huge forest of pine-trees. There is no village or health resort for miles around. The district, however, has been known and frequented since 1725 for its ferruginous waters, and had a little thermal establishment, which was acquired by Dr. Driver and converted into a sanatorium. *Altitude* : 700 metres. *Stations* : Auerbach, Rautenkranz. *Grounds* : 76½ hectares, provided with numerous walks, resting-places and summer-houses, and very diversified in character. It also contains an artificial lake, which is used in winter for skating and sledging.

Buildings : The sanatorium consists of a group of nine large buildings, arranged for the most part along the northern and eastern sides of a large garden, and connected by covered corridors. There are also a few more small buildings, for the staff and management, and a number of rest-shelters.

The residential blocks are divisible into an upper and a lower group : the former for those paying the highest fees. There are six residential buildings in the upper group, also a director's house and casino. Most of them are of three or four stories ; one of them has a large dining-saloon and several assembly rooms, kitchen department, post office and director's quarters. There is a complete hydropathic and bathing installation in the sanatorium.





GROUND FLOOR

FIG. 29.—ALBERTSBERG SANATORIUM—GROUND PLAN

1. Each air Galleries 2. Cloakrooms. 3. Consulting Rooms. 4. Bath Rooms. 5. Dining Saloon.

The lower houses, three in number, are smaller; two are residential, the third is a casino. These bedrooms face east and west. There are also stables, farm buildings, laundry and steam disinfectant. About a quarter of an hour's walk up hill in the park is a house (also under medical control) where patients can obtain rest and refreshment, while they enjoy an extensive view over the surrounding country. Convalescents and friends of patients are also quartered here. Most of the bedrooms in the sanatorium are four metres high; the smallest covers fifteen square metres; most are considerably larger. In the upper group there are no rooms under 100 cubic metres capacity. They are mostly single-bedded; some have two beds.

The walls are painted with oil colours for one and a half metres, and lime- or colour-washed above this. The floors are mostly covered with linoleum. The *heating* is partly by low-pressure steam, partly by cast-iron or tiled stoves. The *lighting* is by petroleum lamps, the "regenerative lamp" being used in the larger rooms. Clocks which are magnetically controlled indicate the hours for rest, meals, etc. There is a good library; some of the more exciting books are starred and forbidden to febrile cases. Patients can attend the church attached to the Albertsberg and Carolagrün sanatoria.

THE ALBERTSBERG SANATORIUM

is about twelve minutes' walk from the Reiboldsgrün Sanatorium. There are six and a half acres of ground; but patients have the use of the surrounding State forest, which is extensive.

Buildings: The sanatorium consists of a number of buildings united by covered corridors into the shape of a T (fig. 29), the centre consisting of two floors, while the rest is on one floor only. There are also several detached buildings for the dwelling of the chief medical officer and inspector, the kitchen block, ice-house, coal-house, stables and laundry. The main block has a southerly aspect, and has red roofs and white walls in the centre, flat "wood cement" roofs elsewhere. From the top of the T four pavilions project, containing dormitories for ten patients each. The space between them is occupied on each side by fresh-air galleries, in the

centre by a large library and common room six metres high, with two cloak-rooms; over these are double-bedded rooms, and a large balcony with side screens. Behind, forming the central stem of the T, is the large dining-saloon, which is six metres high, and capable of seating 100 persons. Over it are eight single-bedded rooms. The foot of the T is formed by a further expansion with bedrooms, etc., on two floors; and behind this, forming a separate block, is the kitchen department. Baths, closets and lavatories are everywhere on the north side. Water supply and laundry are in common with those for the Carolagrün Sanatorium.

Some of the wards are for one to four patients each, others for ten. The *cubic space* allowed is 35 cubic metres per head. The ventilation is by open windows, the upper parts of which are valved; also by ventilating valves and chimneys, which are often common to two rooms. The *heating* is by low-pressure steam; the *lighting* by oil-gas with Auer incandescent mantles. The sewage is treated with dry peat mould. A few *baracken* have been added recently. Fresh-air rest-galleries in the woods.

A church in the woods serves the patients of this sanatorium, and those of Carolagrün and Reiboldsgrün sanatoria.

Staff: One nursing sister.

The Province of Saxony.

THE VOGELSANG SANATORIUM

is at Gommern near Magdeburg.

Buildings: The main block is solidly built, and accommodates the medical officers, dining-room, and beds for forty patients. Another block houses the male staff. A third consists of steam-laundry together with beds for eighty patients. Others are in *Döcker baracken*. There is a section for private patients.

THE SORGE SANATORIUM

is intended for middle-class patients of small means. It is *situated* on a southerly slope of the Harz Mountains, in 11 acres of ground.

Buildings: The main block is mostly of brick on a massive granite base, protected on exposed parts with wooden or zinc tiles.

It is divided by rest-galleries in two tiers into three portions, the central of which, built throughout of granite, looks like a church with a tower. The main entrance is at the eastern end; the patients using one at the western end, where there is a boot-room next the central heating apparatus, and a cloak-room, which owing to the rapid fall of the land is almost entirely above ground. The rest of the basement contains cellars and servants' quarters. On the ground floor, to the right of the main entrance, is the office; to the left the matron's room, and on south and west front are a number of patients' rooms. To the north are the kitchen department, bathrooms, W.C.'s and a nurses' room. On the first floor over the kitchen is the dining-room with a large balcony to the east; in the northern pavilion, consulting-rooms, surgery and inhalation room; in the centre a number of day rooms. On the second floor the arrangement is the same; but over the dining-room are quarters for the second medical officer, and over the consulting-rooms a sisters' room. In the centre is a chapel. In the attics are servants' rooms and a few for patients. Most of the wards are in the lateral buildings, and have from one to three beds; *cubic space*: 37 cubic metres; height: 3.75 metres. Walls are oil-painted below, with rounded angles; floors of terrazzo, tiles, or *torgament*, and in the day rooms of beechwood parquet. Each ward has iron, marble-topped pedestals; iron wash-stand with china basin, chest of drawers, tables, and chairs. Where there are several beds, screens on iron framework are used. There are W.C.'s on every floor; acetylene *lighting*. The laundry and disinfector are in a separate building.

The medical director has a separate house.

LOSTAU SANATORIUM

is *situated* on a hill overlooking the city of Magdeburg and the River Elbe, surrounded by pine-woods.

The *buildings* are somewhat differently planned from the ordinary type of sanatorium, consisting of a number of two-story pavilions running north and south, and united by covered ways and rest-galleries. A central pavilion is devoted to administration, and has the large dining-room in the middle reaching from front to back. Running east and west is a curved covered way with convexity

to the south, from the ends of which run two more pavilions northwards. The northern ends of these are attached by other covered ways to the southern ends of two more pavilions, which are still farther out, the whole thus forming a sort of double staircase in outline. The patients' pavilions are divided by incomplete partitions into a longitudinal corridor separating two rows of cubicles, each of which has two beds. The ends contain rooms for one or three beds respectively, with cloak-rooms, staircase, lavatories, etc.

The administration block is planned for 100 beds. Each pavilion is *heated* by hot-water pipes, and has its own furnace. *Lighting* by electricity.

Anhalt, Dettmold, Meiningen and Weimar.

THE SOPHIENHEILSTÄTTE

was built by the Thuringian Insurance Company for its clients. It is *situated* on a picturesque headland in the midst of pine-woods, overlooking the little town of Tannroda with its ruined castle, and the valley of the Ilm. The *soil* is a beautiful red sandstone, which has been used in building the sanatorium.

Buildings: The building, which is well protected to the north and east, is in the form of a central block with wings projecting back and front. The wards contain from two to four beds each and have a southerly aspect. The larger wards are in the wings in front. Behind the east wing are the bath- and douche-rooms; behind the west wing the sisters' quarters. There are altogether two bath-rooms and a large douche-room. In the centre of the middle block is a large and lofty dining-saloon, and next it a day room. The kitchen is behind, separated from the dining-saloon by the corridor. The windows are all large, but do not reach the floor or the ceiling. The walls are lime-washed; the floors of wood in the bedrooms with fillets to fit into the angles; in the corridors they are of *torgament* (see p. 357). There is central steam *heating*, with two furnaces under the kitchen, and long, large steam-pipes under the windows. A ventilation shaft containing a central steam-pipe is placed in the middle of the building. *Lighting* by electricity. There are eight water-closets with a good water flush. Behind the main block is a courtyard, on the far side of which are stables, disinfecting rooms, etc.

CHAPTER LVIII.

SANATORIA IN WESTERN GERMANY.

COMPRISING Westphalia, Rhenish Prussia, Nassau, Hesse Cassel and Hesse.

In this district there are twenty-six sanatoria with 2761 beds. Two of these are full-price institutions, with together 107 beds. There are also two low-price sanatoria for the middle classes, with 174 beds. Middle-class patients are also admitted to a few of the other sanatoria. For children there are four sanatoria with together 210 beds, one for the pupils in a Diaconal Institution. Children are also admitted in two other sanatoria for adults.

1. Westphalia.—The Lippspringe Group of Sanatoria.

Lippspringe lies in a plain about 140 metres above sea level, protected to the north by the Teutoburg Forest. It has mineral springs, and is resorted to for chronic bronchitis, tuberculosis and pleural effusions. There is one large sanatorium in this district, and several smaller ones.

THE AUGUSTE VIKTORIA STIFT

is *situated* between Paderborn and Lippspringe, surrounded by pine-woods excepting to the south. The site was given free by the parish.

The *buildings* consist of two blocks, one for Evangelical, the other for Roman Catholic patients. Each block has a separate kitchen, but the administrative block and disinfector, douche and bathroom, isolation hut and mortuary are in common. The buildings are similar in every respect. In the basement are the kitchen, store-rooms, and engines for low-pressure steam heating. The bed-

Name and Locality.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Age and Sex.	Beds.
WESTPHALIA—						
Barmen Women's Home, Lippspringe	1900	Dr. Brackmann	W.	4·25	w.	25
Auguste Viktoria Stift, Lippspringe	1901	Dr. Gumprecht	W.	3·70-4·20	w.	242
Auguste Viktoria Children, Lippspringe	"	"	W.	2·25-2·75	ch.	
Children's Home, Lippspringe	1902	Dr. Brackmann	W.	2·25-50	b., g.	20 ¹
Bath Sanatorium, Lippspringe	1903	"	M.	9-12	m., w.	25
Cecilienstift, Lippspringe	1908	"	W.	2·25-2·75	b., g.	65
Lüdenscheid San.	1898	Dr. Stauffer	W.	4·5-50	m.	102
Ambrock San.	1903	Dr. Scheiber	W.	4·5-25	m.	132
Auguste Viktoria San.	—	Dr. Tenholt	W.	—	m.	114
Wilhelmsdorf San.	1907	—	M.	—	b., g.	25
RHENISH PRUSSIA—						
Hohenhonnef San.	1893	Prof. Meissen	M.	9-15	m., w.	82
Waldhof Elgershausen San.	1901	Dr. Liebe	M.	5-9	m., w.	94
Waldhof Elgershausen Children	"	"	M.	4·50	ch.	
Sonnenberg San.	1901	Dr. Henssen	W.	4	m.	114
Ronsdorf San.	1901	Dr. Grau (Ins.)	W.	—	m.	140
Holsterhausen San.	1902	Dr. Köhler	W.	4-6	m.	120
Auguste Viktoria Stiftung	1902	Dr. K. Krause	W.	4-7	m.	145
Grünwald San., Wittlich	1902	Dr. Kaufmann	W.	4	m.	77
Waldbreitbach San.	1903	Dr. Brüel	W.	3·50-5·0	w.	132
Louise Gueury Stiftung	1904	Dr. Schaefer	W.	4·5-50	w.	110
Aprath Children's San.	1911	Dr. Simon	W.	2·50-3	b., g.	100
HESSE NASSAU AND HESSE—						
Ruppertshain San.	1895	Dr. Schellenberg	W.	3·75-5·0	m., w.	183
Oberkaufungen San.	1900	Dr. Fichtner	W.	4·5-50	m., w.	192
Nassau San.	1901	Dr. Stöhr	W., M.	4·7-50	m., w.	84
Melsungen San.	1904	Dr. Roepke	W.	4·25	m.	120
Reichelsheim San.	1897	Dr. Fischer	M.	4·50-5·0	m., w.	80
Ernst Ludwig San.	1901	Dr. Lipp (Ins.)	W.	4·50	m.	136
Eleonoren San.	1905	Dr. Sell	W.	4·50-5·50	w., ch.	102

For contractions, see p. 333.

rooms on ground floor and first floor are all to the south, and over four and a half metres high: they contain from one to four beds apiece. The rest-galleries are three in number on each floor, central and lateral. In a projecting pavilion to the north is the dining-room, and over it the nurses' quarters. The floors are of *torgament*.

¹ May-October inclusive.² Ninety-five in winter.

Electric lighting is from the town supply. There are shafts for dirty linen to the basement.

2. Other Westphalian Sanatoria.

THE LÜDENSCHIED FOLKS SANATORIUM,

for Altena, is *situated* between the villages of Hellersen and Brünninghausen, on the south side of a wooded hill, with meadows in front of it and hills to the north-east. *Altitude*: 420 metres.

Buildings consist of a main block, an administrative block, doctor's villa, and open-air galleries. The main block has a basement, ground floor, and three upper floors, all the patients' rooms being to the south.

Behind the main corridor are three pavilions projecting north. The central one is separated by the entrance drive, bridged over on the first floor. It contains the kitchen department, above which are the dining-saloon and quarters for second medical officer and female staff. The western pavilion has bath- and douche-rooms, lavatories, and a ward kitchen, the eastern the laundry and disinfectory, linen-rooms, etc.

The lavatories have water laid on over each fixed basin, and shelves above for washing utensils. In each bathroom are three fixed baths and a dressing bench of xylolith plates. In the douche-room are various douche and spray apparatus, and a compartment where the medical officer can regulate the temperature. A separate bathroom is provided for the staff. The W.C.'s on each floor have porcelain basins with oaken seats and automatic flush. The urinals also have automatic water supply; these walls are of polished granite, the floors of terrazzo. The main staircases are at each end of the corridor. On the south side are in the centre the office, consulting-rooms and laboratory, a large day room overhead; and higher still a ward with seven beds. At the ends are large rooms on each floor, one of which is used as a day room, the rest being eight-bedded wards. Between centre and ends are other bedrooms with from one to four beds apiece. They are furnished with iron bedsteads, steel and horsehair mattresses, iron pedestals with glass plate, and a clothes locker for each patient. The floors are covered with

linoleum. Every room has a ventilation shaft and electric bells. *Heating* is by low-pressure steam; *lighting* at present is by petroleum; in the future by electricity. There is a boot room on the ground floor. The laundry machinery is driven by a benzine motor. The disinfectors have separate approaches for dirty and clean linen. The rest-shelters form curves to the sides of the building, with the doctor's house at one end.

Staff: Three Red Cross Sisters attend respectively to the housekeeping, secretarial work, and nursing. There are also a bathman, porter, cook, two kitchen maids and two laundry women.

THE AUGUSTE VIKTORIA SANATORIUM,

Beringhausen, near Meschede, for the members of the General Trades Union of Bochum, is *situated* on a plateau, 113 metres above the valley and 420 above the sea level, made by blasting the rock. There is a steep descent to the south, and good shelter in other directions from neighbouring mountains.

Grounds: 690 hectares. *Station*: Meschede, 6 km.

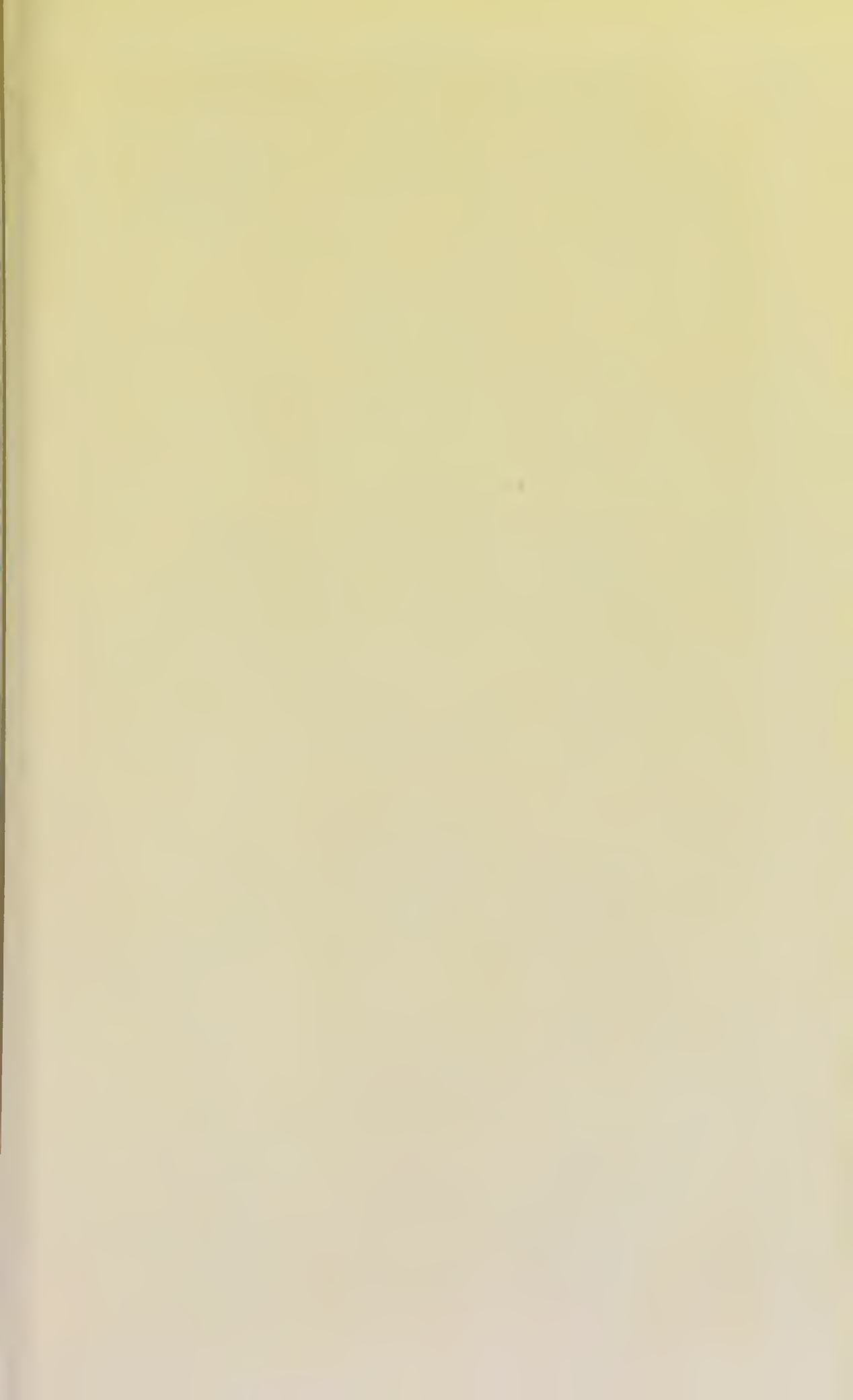
Buildings: The patients' quarters are in two sections separated by rest-shelters. There are 118 beds on three floors, most of the wards containing five beds, others having four, three, two or one. There are six day rooms, a lavatory and disconnected closet to each floor, in addition to the main bath- and douche-rooms, which are behind the centre and surmounted by a chapel. Floors are mostly covered with terrazzo. *Heating* by steam pipes. *Lighting* electric. The dining-room is in a separate wing at the east end. An underground passage leads to the administration block and engine-house, which are farther east. An electric railway down the face of the cliff, used in constructing the sanatorium, is now used for other purposes.

REFERENCE.—"Zeitschr. f. Tuberk.," 1904, i. p. 567.

3. Sanatoria in the Rhine Province.

HOHENHONNEF SANATORIUM.

Opened by a joint stock company, many of the shareholders of which were medical men. It may be regarded as the successor to the Falkenstein Sanatorium, now demolished.



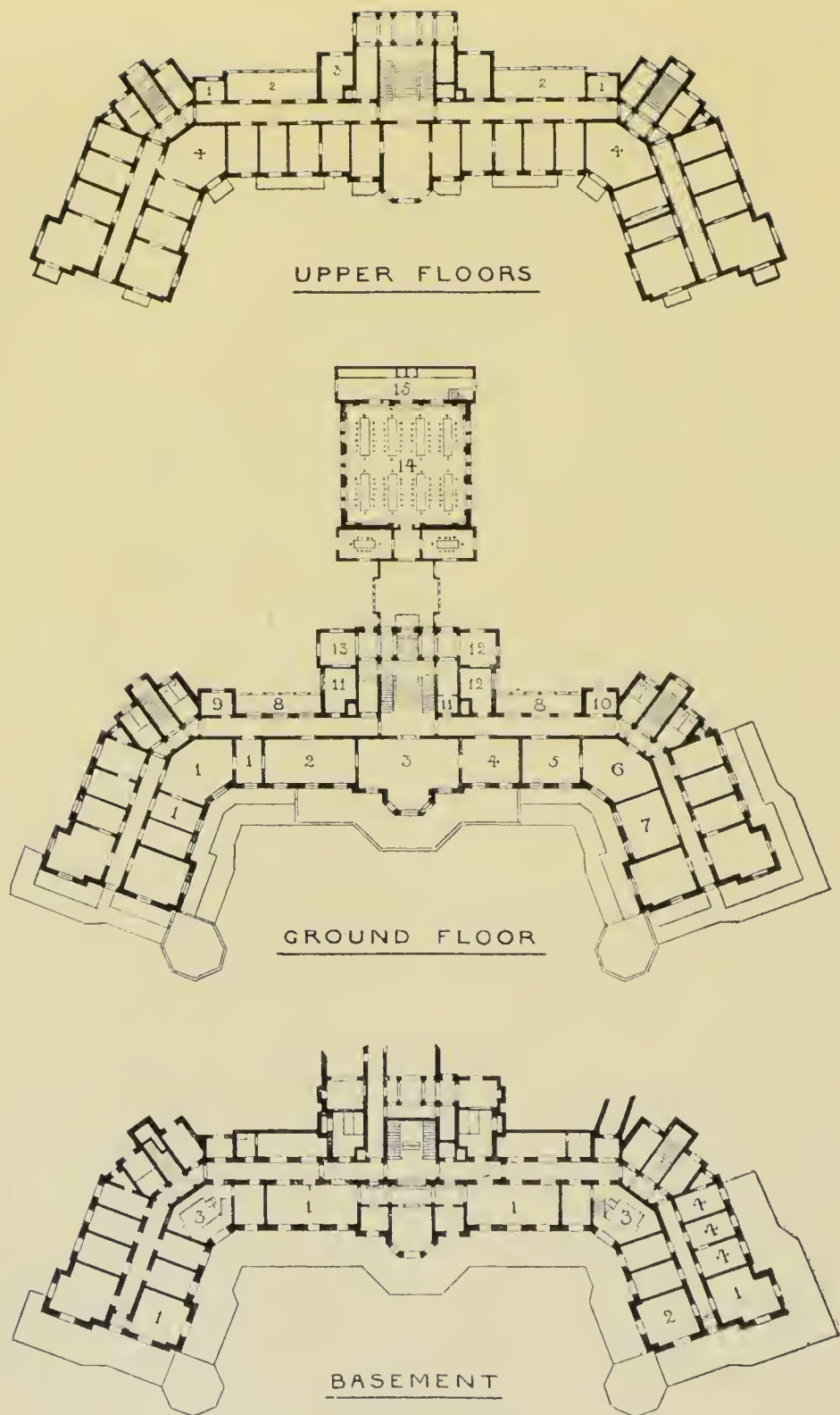


FIG. 30.—THE HOHENHONNEF SANATORIUM

Basement :—

1. Cloak Rooms
2. Inhalation Room

Ground Floor :—

1. Consulting and Waiting Rooms
2. Winter Garden
3. Reception Room
4. Reading Room
5. Ladies' Room
6. Music Room
7. Billiard Room

Upper Floors :—

1. Nurses' Room
2. Balcony

3. Heating Apparatus
4. Douche Rooms

15. Serving Room

8. Cloak Rooms
9. Servants' Room
10. Nurses' Room
11. Hairdressing Room
12. Office
13. Post Office
14. Dining Saloon

3. Small Kitchen
4. Room for Convalescents

Situation: In the Siebengebirge, on the right bank of the Rhine opposite to Rolandseck, with fine views of the river valley and the distant Eiffel Mountains. There is a steep ascent from Honnef with its railway station by the river. *Soil:* Lower Devonian, consisting of hard rocks at a considerable angle. *Altitude:* 236 metres. *Grounds:* 40 hectares, consisting of garden, vineyards and woodland.

Buildings: The sanatorium, which is built of white stone and plaster, makes a very conspicuous landmark above the river side. It has a south-westerly aspect, and is well sheltered by higher hills (from 90 to 210 metres higher) on the north and east.

The sanatorium is a beautiful five-story building (fig. 30) with two wings which diverge at an obtuse angle. Owing to the slope of the hill, the basement is on the ground level in front, while the entrance behind is on a higher floor. The basement is occupied by cloak-rooms, bath- and douche- and inhalation-rooms, furnaces for heating the building, and a few bedrooms for visitors. On the same level, in front and round the eastern wing, is a deep verandah with cemented floor, which can be protected when necessary with glass, and part of which can be cooled in summer by streams of water on the roof. This is used as a fresh-air gallery, and is provided with cane lounge chairs, electric lights and bells, and small tables. Above it is an uncovered balcony. On the ground floor of the building are a series of intercommunicating handsome reception-rooms, consulting-rooms, laboratories, and drug-rooms, as well as a few bedrooms for patients, and near the entrance the bureau and post office. The upper floors contain patients' rooms in a single row along the centre, a double row in the wings. There are large balconies both front and back, the northerly ones being specially frequented in summer during the heat of the day. Bath-rooms, water-closets, rooms for attendants and nurses, and a large room for convalescents, are found on all the upper floors, which are served by a lift for patients, as well as staircases. The patients' rooms are nearly all on the sunny side of the building, and are well ventilated and all single-bedded. Each is four metres high, and has large windows and a chimney; while none have less than 70 cubic metres *air space*. The windows are double, for extra

protection in stormy weather ; the doors are also double, to prevent noise. Great care has been taken in constructing and arranging the sanatorium so as to facilitate thorough disinfection and cleansing without raising dust. Angles and corners are rounded, projecting cornices and mouldings avoided. The floors are made of "gypsdielen," consisting of bamboo and other light materials, incorporated with plaster of Paris, and are covered with linoleum or parquet. The walls are papered, as it is contended that this facilitates natural ventilation through their pores. Carpets, curtains and the like are sparingly used, and chosen of kinds which do not hold the dust and are readily cleaned. The furniture also is simply constructed but comfortable ; leather-covered chairs, cane-lounges, and the like. The whole building is heated with low-pressure hot-water pipes, which can be separately regulated in every room, and is *lighted* by electricity. Even the summer-houses in the woods and the fresh-air galleries are provided with electric light and electric bells. The dining-saloon—a large, handsome, well-lighted room—is situated in a detached block to the north, reached by a bridge from the first floor, and has no direct communication with the kitchen department and storage rooms beneath. The servants sleep in a separate building in the wood behind the sanatorium. The water supply, which is excellent, comes from a deep well in the Asbach Valley, about half a mile behind the institution, where also are found the steam laundry and disinfector, and the engines for pumping and electric lighting. There are separate houses near the western wing for the chief medical officer and the managing director, and a small Roman Catholic chapel in the grounds. For Protestants service is held once a fortnight in the ladies' saloon. There is a good library ; concerts are held about once a fortnight.

Staff: There are altogether seventy-nine in the staff, including three male and three female nurses.

THE WALDHOF ELGERSHAUSEN SANATORIUM

is *situated* between Giessen and Cologne, on the south-west declivity of the Westerwald, on the watershed between the Dill and the Ulm, surrounded by pine woods in a very picturesque neighbourhood. The Taunus Mountains, Feldberg and Altkönig, are

visible in the distance. *Station*: Katzenfurt. *Soil*: Clay-slate, gneiss, and porphyry. *Altitude*: 375 metres.

Buildings: The sanatorium consists of a main building (*Heiligenhaus*), originally an abbey attached to a large church, later on the residence of the late Prince Albrecht of Solms-Braunfels, and converted by Dr. Liebe to its present uses; in addition there are a small administrative block (originally a hunting lodge) and a number of more modern additions. There are at present seven solidly built houses, a wooden summer-house with two beds, and five rest-shelters. The establishment is intended as a link between the sanatorium for the people and the more expensive private sanatoria. It consists of three divisions, a first class for full-price patients, a second division for children, a third being for adults paying lower fees. The better class rooms are partly in the old building, partly in a modern erection (*Eigenhaus*). The main building contains on the ground floor, kitchen, staff-room, two dining-rooms, reading-rooms and a few bedrooms for patients. On the upper floors are other bedrooms and in the attics the servants' quarters. The *Eigenhaus* is built in accordance with modern ideas, the floors of *torgament* brought up on to the walls in a curve; the walls enamel painted; the windows and doors free from projections, etc. In the first divisions the bedrooms are mostly single-bedded; the second and third have wards, each with a number of beds. The children's division has four wards, each with seven beds. Arrangements are made for schooling out of doors. There is another block containing the benzine motor, dynamo and accumulators, laundry, bakehouse, bath- and douche-rooms, disinfector and mortuary. The stables and cowsheds are in another building. There are also a bath-house with complete installation and an open-air swimming bath: also air baths and sun baths.

THE RONS DORF SANATORIUM

was built for the clients of the Rhine Province Insurance Company at Dusseldorf. It is *situated* in the upper part of a valley, open to the south-east, richly wooded with firs and deciduous trees.

Buildings: A main building, dining-room, administration and engine-house. The main building has day rooms on the ground

floor and basement, the latter united with the rest-shelters by glazed verandahs and corridors. Near the entrance are boot-cleaning rooms, douche-room, six bathrooms, and a room for cleaning the spit-flasks. The wards have from one to six beds each, and are on the ground floor, first and second floors, and a few in the attics. Six single-bedded rooms have wide balconies in front of them, on to which beds can be wheeled. On each story there are two lavatories, each patient having his own place in them; also four W.C.'s. The floors are without cracks, made of *torgament* or in parts tiled or covered with linoleum. The walls are painted to the height of two metres. There are ventilating shafts in each room, to carry off the foul air to the roof. The dining-room is at the eastern end, projecting forwards from the building line. The kitchen is under it. The rooms for matron and women servants are in the main block. The laundry and engine-room are separated by the yard from the administration block. The rest-shelters have wooden backs with windows to them and roll-up blinds.

THE HOLSTERHAUSEN SANATORIUM,

near Werden on the Ruhr, is *situated* between Velbert and Kettwig, on a sheltered southerly slope looking towards the valley of the Ruhr. *Grounds*: 378 acres.

Buildings: A main building, a medical officer's house, and an engine-house. The main building is of granite on raised foundations, and is double, with a northern and southern portion and connecting link. The northern portion has in the basement a boot-room with exit to a small court for cleaning the boots; also two day rooms, a gymnastic room, disinfector for sputa, dirty linen room, bathroom and quarters for male servants. In the northern portion, which runs parallel, is the dining-room, with kitchen underneath; the office, consulting-rooms and laboratory. The basement and three upper stories of the southern portion contain the twenty wards, seven being single-bedded. There are four large rest-galleries, one of which can be used as a promenade. There is a separate building for examination before admission, and for operations.

The doctor's house is to the east, and farther east the engine block.

THE AUGUSTE VIKTORIA STIFTUNG,

at Rosbach on the Sieg, is intended for the city of Cologne.

It is *situated* on a very rapid slope in the midst of a tract of mixed woodland, open to the south, sheltered to the north and east.

Buildings: A main block with the engine block to the west, the administration block to the north, and rest-shelters to the east. In the administrative block are, near the entrance on the ground floor, cloak-rooms, boot-rooms, dining-room for doctors, porter's room, office, consulting-room, W.C.'s and quarters for the servants. In the basement are the kitchens; and on the first floor a large dining-room and a chapel. Over this, the quarters of the two medical officers and matron; also the library, bathrooms and W.C.'s for the staff. Connecting the administrative with the main block is the chief staircase. In the main block are, in the basement, the heating apparatus, sputum boiler, cellars, bath- and douche-rooms, and four day rooms; and near the main staircase a place for emptying the spit-cups. Also an inhalation room, a bath for men-servants approached from the yard behind, and entrance for the coal carts, which drive in and are tipped up after the door is shut. The two upper floors are occupied mainly by the wards, six with eight beds, two with six, ten with four, four with three, eight with two, and two single bedded. *Cubic space* per head: 32-57 cubic metres. The lavatories are at the ends of the building. On the first floor is an examining room and laboratory. In the attics are four patients' rooms with separate lavatory and W.C.; also box-rooms and servants' rooms. The rest-shelters are solidly built in two stories, and form four successive steps; cloak-rooms and W.C.'s are attached. The engine block has with it the laundry, and over it the men's quarters. The floors are of cement or terrazzo, excepting in the wards, where they are of *torgament*; in the corridors, linoleum. The walls in bath-rooms and lavatories are of glazed tiles and white enamel; elsewhere painted 1·60 metres high, coloured washed above. Day rooms have

washable walls ; staff rooms are papered. There is a separate medical director's house.

THE WALDBREITBACH SANATORIUM,

for the city of Coblenz, is on the slopes of the Westerwald, looking south-south-east towards the valley of the Wied. *Stations*: Neuwied, Hünningen. *Altitude*: 240 metres. *Grounds*: 35 hectares of mixed woodland.

Buildings: A main building for patients, management, assistant medical officer and servants ; a kitchen block ; an engine-house with laundry ; medical director's house ; stables and washhouse next to the engine-house.

The main block has a straight front with four floors and attics, and three peaks. Owing to the rapid slope the basement is above ground on the south side. It contains the *heating* apparatus—three low-pressure steam boilers, two for the greater part of the building, the third for the bathrooms, also the bath- and douche-rooms, the laboratory, day rooms and recreation rooms. In front of it the garden has been levelled up between the rest-shelters, which are in two tiers, connected on the east with a playground. Two more rest-shelters are in the wood. The ground floor contains single-bedded rooms separated by sliding doors from a wide balcony (2·2 metres) below which is a cemented walk for wet weather. The wards on the four upper floors are for one, two, four, five, seven and eight beds respectively.

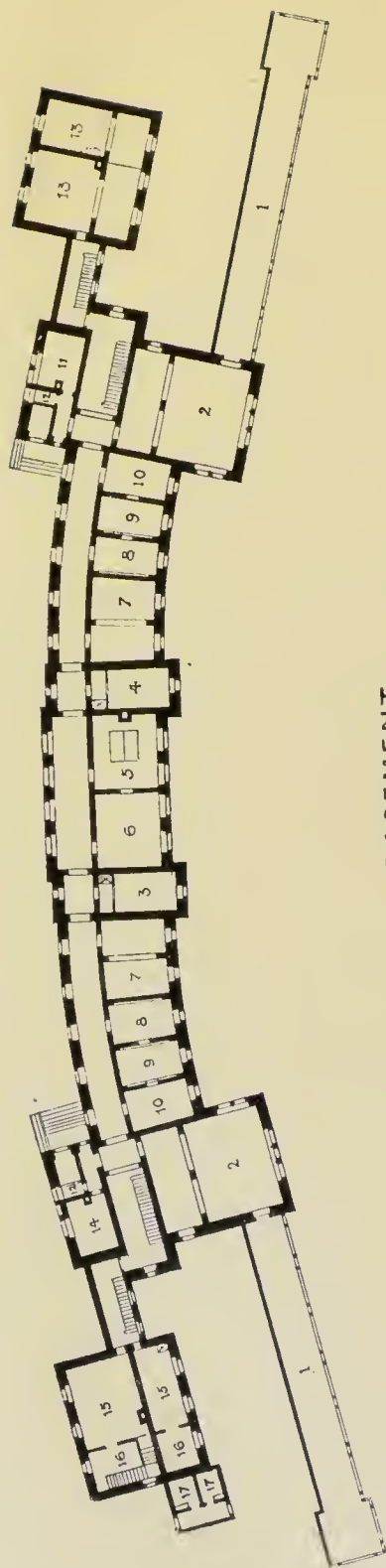
The floors are of *torgament* in bathrooms and laboratory, etc., linoleum covered in the wards. Walls and doors are painted ; shafts are placed in the dividing walls ; fanlights over all windows, which also have blinds. The W.C.'s are to the north of the corridor. Next them are places for cleaning spit-cups.

4. Sanatoria in Hesse Nassau and Hesse.

THE RUPPERTSHAIN SANATORIUM

was founded at the instigation of the late Dr. Dettweiler. A small village house in Falkenstein was rented in 1892 for a sanatorium for the poor ; this was later on replaced by the Ruppertshain in-





BASEMENT

FIG. 31.—RUPPERTSHAIN SANATORIUM



GROUND FLOOR

FIG. 32.—RUPPERTSHAIN SANATORIUM

stitution. It was the first sanatorium to be opened in Germany for the poor. The present structure is *situated* at the head of a wide valley, sheltered on three sides by mountains, overlooking the valley of the Main as far as the Odenwald. This includes the beautiful Taunus district, where one of the earliest German sanatoria—Falkenstein Sanatorium, now non-existent—was founded by the late Dr. Dettweiler. The *soil* of the district consists of slate, gneiss, and porphyry. *Grounds* of the Ruppertshain Sanatorium $4\frac{1}{2}$ hectares, partly meadow, partly woodland. *Altitude* : 400 metres.

Buildings : Originally a four-story building forming a shallow curve with thickened ends, continued in the shape of rest-shelters. More recently a new kitchen and dining-rooms have been built at the eastern end, and beyond this a new wing for women ; resembling the original portion.

The basement (fig. 31) is occupied by cellars, heating apparatus and bath- and douche-room on either side. The ends, which project slightly, contain two common rooms next the fresh-air galleries. On the ground floor in the centre are the rooms for the chief medical officer and the matron. Corresponding parts in the two next floors (fig. 32) are occupied by two large dining-saloons. There are also a nurses' room and a small ward kitchen on each side and on each floor. The rest of the building on the south side is occupied with bedrooms. These open into well-lighted corridors, two metres wide, which have no other rooms to the north, excepting at the ends, which contain lavatories and closets, and in the basement also a mortuary.

The wards are arranged for one, three, and five beds respectively. Men and women have separate sun galleries and dining-rooms. There are large verandahs in front of the latter.

The building is *heated* by low-pressure steam. For ventilation, the windows are constantly left open, day and night. There are ingenious wooden shutters attached to the windows, worked from inside, which admit air while they exclude rain, and can also be arranged as sun-blinds.

THE OBERKAUFUNGEN SANATORIUM

is *situated* on a wooden cliff with a south-west aspect, not far from Cassel.

Buildings: The main block is of several stories; dining-room to the north, with kitchen beneath. Wards have from one to seven beds, ten being single-bedded. There are separate lavatories and day rooms for the two sexes. *Heating* is by low-pressure steam; *lighting* by electricity. The rest-shelters are to the sides. There is a separate doctor's house.

THE NASSAU SANATORIUM

is at Naurod in the Taunus district, near Wiesbaden. *Altitude*: 280 metres. *Station*: Niedernhausen.

THE MELSUNGEN STADTWALD SANATORIUM

is intended for the members of the Sick Benefit Society of the Prussian Hessian Railway Company.

THE ERNST LUDWIG SANATORIUM,

Sandbach, is *situated* in the Eastern Odenwald, sheltered to the east and north by wooded hills, in the valley of the Mümling, which runs south-west. *Grounds*: 8 hectares, mostly pine-woods.

Buildings: Consist of a three-story main building, united by a covered way with an administration block to the north, separate laundry and pumping-house, doctor's residence, engine-house and stables. The main building has in the basement a chapel in the middle, day rooms at the ends; also cloak- and boot-rooms, bath- and douche-rooms, heating chambers, W.C.'s and baths for staff. On the ground floor are to the north side, the staircase in the centre, sisters' rooms, warders' room, and writing-room to the sides. The twenty-six wards are in the three upper floors, each with two to six beds; *cubic space*: $30\frac{1}{2}$ to $34\frac{1}{2}$ cubic metres per bed. There are six lavatories placed at the ends of the corridors. The walls are painted below, lime-washed above, and in the bathrooms are tiled. The staff rooms are papered with sanitary paper. There are two rest-shelters, one along the main building, another parallel to this but in front on a lower level. There are also *Döcker* shelters increasing the accommodation in summer time. The covered way which connects the main block with the administrative block is used as cloak-room, and leads to the dining-room on the first floor.

The basement of the administration block contains various consulting-rooms, laboratory, office and linen-rooms. On the second floor are store-rooms and quarters for the maids, including separate baths and closets.

The doctor's residence is near the entrance gates. The engine-house is 130 metres from the main building. *Lighting* by electricity; *heating* by low-pressure steam and by hot air. There is a mortuary behind the laundry, east of the main building.

REFERENCE.—"Zeitschr. f. Tuberk.," 1902, iii., 2.

CHAPTER LIX.

SANATORIA IN SOUTH GERMANY.

COMPRISING Alsace-Lorraine, the Palatinate, Baden, Wurtemberg, and Bavaria ; including the region of the Black Forest. There are thirty-six sanatoria in this district, with 3472 beds between them (including one in process of erection). Of these, eight are full-price sanatoria with 672 beds. There are also a few beds for the middle-class in the Folks Sanatoria, and one low-price sanatorium for the same class. There is one children's sanatorium with thirty-nine beds, and four for adults which admit children.

Name and Locality.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Age and Sex.	Beds.
ALSACE-LORRAINE—						
Lorraine San., Albersweiler	1900	Dr. Franke	W.	3'50-4'50	m.	57
Tannenberg San., Saales	1904	Dr. Scheib (Ins.)	W.	4-6	m.	142
Leopoldinenheim-Altweiler	1904	Dr. Grasser (Ins.)	W.	3'50	w.	90
Pappenheim San.	—	—	W.	Ins.	m., w.	118
BADEN—						
Nordrach Colonie	1889	Dr. Schmidt (Ins.)	W.	—	m.	110
Rothschild San.	1906	Dr. Ascher	W.	Free	m., w.	42
St. Blasien San.	1878	Dr. Sander	M.	9'50-13'50	m., w.	110
Arlen San., Hohentwiel	1897	Dr. Weibel	W.	1'50-3'0	w.	16
Luisenheim San.	1905	Dr. Curschmann (Ins.)	W.	—	w.	200
Friedrichsheim San.	1899	Dr. Curschmann (Ins.)	W.	—	m.	23
Villa Paul, Badenweiler	1903	Drs. Fränkel and Steffen	M.	10-16 ³	m., w.	20
Wehrawald San.	1901	Dr. Lips	M.	10'50-14'50	m., w.	95
Ebersteinburg San.	1906	Dr. Rumpf	M.	10-15'75	w.	70
Friedrich Hilda Cons. Hosp.	1907	Dr. Hettinger	W.	1'30-2'30	m., w.	93
Stammberg San.	1904	Dr. Schütz	W.	4'50-6'50	w., ch.	92
WURTEMBERG—						
Schömberg San.	1890	—	M.	7-11	m., w.	100
„ New San.	1899	Dr. Schröder	M.	10-12	m., w.	120

¹ Eighty-five in winter.

² Twelve in winter.

³ Medical attendance extra.

Name and Locality.	Opened.	Medical Officers.	Social Class.	Terms in Marks per Day.	Age and Sex.	Beds.
WURTEMBERG <i>cont.</i> — Schwarzwaldheim San.	1902	Dr. Bandelier	M.	7-10½	m., w.	78
Wilhelmsheim San.	1900	Dr. Elliesen (Ins.)	W.	—	m.	177
Ueberruh San.	1908	Dr. Brecke (Ins.)	W.	—	w.	197
Charlottenhöhe	1907	Dr. Schütz (Ins.)	W.	3-5	m., w.	88
Sec. " Child.	"	"	W.	2	ch.	12
Böblingen San.	1901	Dr. Kraemer (Surg.)	M.	6-11	m., w.	28
" Child. Sec.	"	"	M.	—	ch.	12
Schönbuch San.	—	Dr. Brühl	M.	8-12	b., g. }	39
" 2nd Class	—	"	M.	5-9	b., g. }	
BAVARIA—						
Dannenfels San.	1893	Dr. Boyé	W.	—	m.	40
Schönstett San.	1893	Dr. Schreckenbach	W.	—	w.	105 ¹
Planegg San.	1898	Dr. Krebs	W.	4-7	m.	155
Harlaching San.	1899	Dr. Hörmann	W.	3-3'50	w.	106
Engelthal San., Hersbrück	1900	Dr. Brautigam	W.	3	m.	108
Luitpoldheim San.	1901	Dr. Pischinger	W.	3'50	m.	61
Kirchseon San.	1902	Dr. J. Vorster	W.	—	m.	100
Fürth San.	1903	Dr. Ziller	W.	3-4	w., ch.	66
Pfalz San., Ramberg	1905	Dr. Albert (Ins.)	W.	3'50-4'50	m.	60
Bischofsgrün San.	1907	Dr. Brandes	W.	3'50-4'50	m.	77
Haustein San.	1908	Dr. Hohe	M.	4'75-5'50	m., w.	76
Donaustauf San.	1908	Dr. Strohlein	W.	4-5	m.	60
Wasach San.	in con.	Swabian Ins. Co.	W.	—	m., w.	120

For contractions, see p. 333.

1. Sanatoria in Alsace-Lorraine.

THE TANNENBERG SANATORIUM

is *situated* in a valley running south-east from the Vosges, protected by mountains in every direction excepting the south, where it overlooks the town of Saales.

Buildings: Three buildings united by double-tier rest-shelters. The lateral buildings have a basement, two upper stories and attics, and alone contain the wards. The central building is for administration and for the common dining-room, etc. On the ground floor of each lateral building are cloak-rooms and day rooms. The upper floors have lavatories for fourteen patients each, and wards, mostly for two to three beds, a few with four, and sixteen single-bedded. There is a bathroom on each floor, and a few portable baths are

¹ April-November.

also provided with means to fit them up for use in the rooms of bed-ridden patients.

The examination room, laboratory, office, and quarters for the medical director and most of the staff, are in the central block ; there is a covered wall with big windows behind each rest-shelter. The engine-house, with heating apparatus, laundry, and lighting apparatus, is in a more distant block. *Heating* by high-pressure steam, converted into low-pressure steam in the buildings. *Lighting* by electricity.

Staff: The medical director, two sisters, two nurses, housekeeper, kitchen sister with six maids, secretary, engineer, furnaceman, porter, and laundry-woman.

REFERENCE.—“*Zeitschr. f. Tuberk.*,” 1904, vi. 1, p. 169.

2. Sanatoria in Baden.

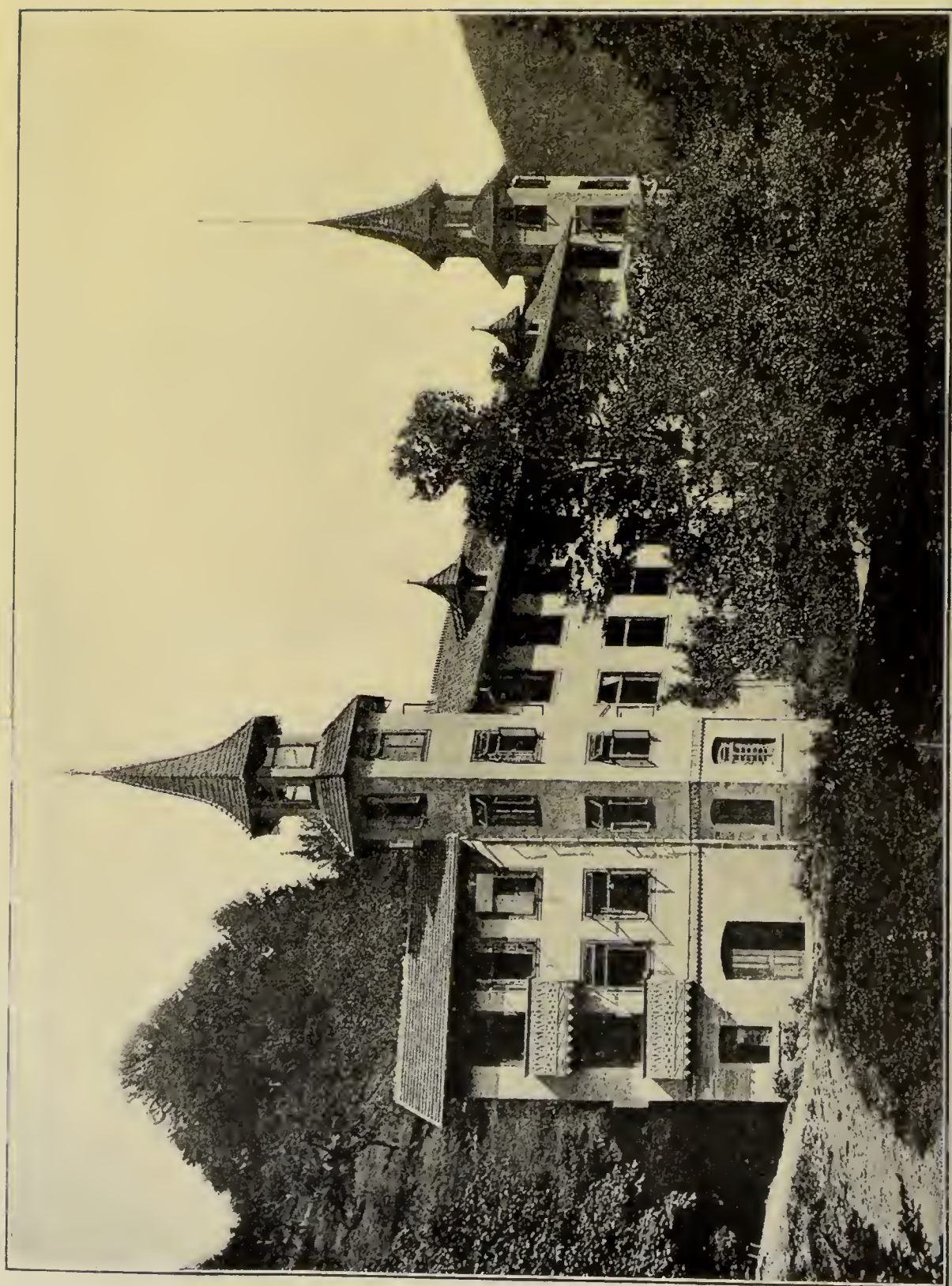
NORDRACH COLONIE SANATORIUM.

This sanatorium was originally founded by Dr. Otto Walther, and acquired in 1908 by the Baden Insurance Company for their clients.

It is *situated* about four and a half miles from the little village of Nordrach, in a sheltered valley surrounded by pine-clad heights, in the midst of the Black Forest. *Station*: Biberach, Zell. *Soil*: A coarse red sandstone, very permeable. *Altitude*: 460 metres. *Grounds*: 80 acres, provided with paths of all gradients, with seats at intervals.

Buildings: Detached buildings, mostly resembling village houses, but with ample arrangements for ventilation. The office, kitchen department, and rooms for the staff are situated in the old *Gast-haus* (or inn) *zum Anker*, which is connected by telephone with the railway station at Biberach, and with the patients' houses. Attached to this building is the dining-saloon, a light and cheerful building about forty by twenty feet, with large windows back and front, linoleum-covered floor, and varnished panelled wooden walls. These windows are taken out of their frames during the warmer part of the year ; those in front look out upon the road, those behind on the side of the hill. The main building (or Anstalt) (fig.





33) is situated on the slope of the opposite hill, some twenty or thirty feet higher than the dining-saloon. It is a plain wooden building with a little turret near each end, consisting of single rows of bedrooms on the first and second floors with corridor at the back. The main aspect is south-east, and the ends of the building retreat slightly to follow the convex face of the hill. The patients' bedrooms are not particularly large (3·5 metres \times 4·5, and 2·7 high), but they have a relatively large window space amounting to about half the size of each room, and the windows and doors are permanently kept open. The walls and ceilings are entirely lined with plain varnished wood, which is revarnished whenever a patient leaves. The floors are covered with linoleum, which is washed down every morning. In one corner of each room is a shower-bath or douche apparatus; in another is a plain iron bedstead with woollen bedclothes; and the remaining furniture is of lacquered wood or iron, and of equally simple character. There are a few strips of carpet, and washable curtains. Hot and cold water are laid on for the douche and the washstand. The corridor is similarly built with pinewood panelling, which here is oiled. The windows of the corridor are opposite the bedroom doors. The water-closets, which are built out of the corridor, are provided with a good flush of water. Twenty patients can be accommodated in this building. The rest are lodged in other villas farther up the valley. Since the sanatorium passed into the hands of the Baden Insurance Company, a complete hydropathic installation has been added, a large rest-shelter with day rooms attached, and a recreation place; the dining-hall has been enlarged, and various other improvements effected. *Heating* is by low-pressure steam pipes. *Lighting* by electricity.

THE ROTHSCHILD SANATORIUM.

Opened in 1906 by M. A. von Rothschild as a free sanatorium for Jews, in the Nordrach Valley.

THE ST. BLASIEN SANATORIUM

was founded by the late Dr. Haufe, but now belongs to Dr. Sander.

St. Blasien is an ancient and picturesque little town in the valley of the Alb, in the southern portion of the Black Forest, famous for its eleventh-century cloisters and church, and boasting of a flourishing kursaal and hydropathic establishment. The district is on primary rocks. The town itself is somewhat shut in, as, notwithstanding its elevation above the sea level, it is surrounded on all sides by mountains, one of which—the Feldberg—is the highest peak in the district, and rises to a height of 1490 metres. This circumstance renders the place unpleasantly hot in the height of summer, although in winter it is probably much more agreeable. The drainage is also somewhat primitive. Dr. Sander's sanatorium is at the western end of the town, with the forest behind it.

Altitude : 800 metres. *Stations* : Titisee (Höllental Railway) 30 km. ; Albbrück (line from Constance to Basel) 27 km. *Grounds* : A well-kept garden ; many sheltered paths and a large shelter for bad weather in the adjoining forest.

Buildings : The sanatorium consists of three separate buildings enclosing a terrace with a glass verandah. There are a number of common rooms. Most of the bedrooms are in the central block on the three upper floors, about half being in single row. Most of the building is of fire-proof material.

The interior decorations are those usual in a good sanatorium. *Lighting* by electricity. *Heating* by low-pressure steam. Modern sanitary arrangements.

THE ARLEN SANATORIUM

was built by Carl Ten Brink for the benefit of his workmen. It is a branch of the Heinrich Hospital in Arlen, not exclusively for consumptives.

Situation : In the Black Forest, at the foot of a mountain which shelters it from north and east winds. *Grounds* : 1·2 hectares, surrounded by other gardens.

Buildings : It consists of one story on a high ground floor, arranged in two symmetrical halves, for eight male and eight female patients. On each side are a large day room, one dormitory for four beds, two rooms with two beds apiece, and a lavatory.

The bedrooms have an average space of 48 cubic metres per bed. There are a common dining-room, kitchen, matron's and doctor's rooms, and two bathrooms. On the south side of each half is a large verandah, and smaller ones to east and west, besides a long covered walk in the garden. The building is *heated* by warm-water pipes and *lighted* by electricity. Every room has a chimney for ventilation. The walls are enamel-painted.

THE FRIEDRICHSHEIM SANATORIUM

is *situated* on the Blauen Mountain, amongst pine-woods; it is intended for the clients of the Baden Insurance Company.

Buildings: A T shaped mass consisting of a four-story south front, with a three-story pavilion stretching northwards from its centre, and smaller sanitary pavilions near the ends. On the ground floor of the south front are common rooms, cloak-rooms, douche- and bath-rooms, quarters for second medical officer and rooms for destroying sputa and cleansing spit-cups. On the upper floors are the wards, forty-five in all, with one, two, or four beds in each; *height* 3.40 metres; *cubic space*, 28 to 42 cubic metres per head. Angles are rounded, floors covered with linoleum, walls with washable paper. The windows reach the floor, even where there is no balcony. The lavatories and W.C.'s are north of the corridor in the sanitary pavilions. The northern central pavilion has on the ground floor the linen-rooms, store-rooms and cellars, over this the dining-saloon, office and consulting-rooms, and above these the quarters of the matron and nurses, the steward and the chaplain. A linen lift for clean linen and a shoot for dirty linen connect each floor. Most of the wards are on the south front in a single row; but behind this is a double row leading to large wards in the northern pavilion. The kitchen department is in a separate building to the north; the engine-house with laundry, etc., lying north-east, and the medical director's house to the east near the entrance. There are additional beds in Döcker chalets for summer. The rest-shelters are at an obtuse angle with the south front, at the sides.

The *Luisenheim* is a sister institution in the same district.

THE WEHRAWALD SANATORIUM

is *situated* at Todtmoos in the Black Forest, on a spur of lofty and thickly wooded hills overlooking the valley of the Wehra, surrounded on two sides by pine-woods and on three sides by lofty mountains. Todtmoos is a recognized health resort. *Soil*: Granite rock. *Altitude*: 860 metres. *Station*: Wehr, on the line from Basel to Schöpfheim. Drive of two and a half hours.

Buildings: A main building, a separate medical officer's house, and an engine-house with laundry and lay manager's house at the bottom of an adjacent valley. The main building is a beautiful and sumptuously furnished five-story erection, with a straight front, a large verandah on the south side, ending at one end in a summer-house, at the other in the medical officer's house; and balconies to the other floors. The central portion is one room thick, with corridor to the north, but the ends of the latter are blocked. The bedrooms have double doors. The wings are of one story. In the western is the dining-saloon; in the eastern the bathrooms, consulting-rooms, etc. The internal decoration is that of a good sanatorium. *Heating* by low-pressure steam; *lighting* by electricity; modern sanitation.

THE EBERSTEINBURG SANATORIUM

is *situated* on the slope of a hill with good shelter to the north and east. It is about an hour's journey from Baden-Baden station.

The *building* contains forty bedrooms in single row, mostly on the south side, a few to the west, with lavatories, etc., to the north. A wing runs back from the western end containing the kitchen, and over it the dining-room.

REFERENCE.—"Zeitschr. f. Tuberk," 1905, vii. 1, p. 557.

THE FRIEDRICH HILDA CONVALESCENT HOME,

near Müllheim, was built by the Sick Benefit Society for the Baden State Railways and Saltworks, Karlsruhe, for their own members. *Station*: Oberweiler.

3. Wurtemberg.

THE SCHÖMBERG GROUP OF SANATORIA.

Schömberg is a village in the Black Forest, placed in a valley between the Enzthal and the Nagoldthal, surrounded by pine-clad heights to the north, east and west. The *soil* is of porous sandstone (Bunter sandstein); the *altitude* about 650 metres; the climate in summer cool and pleasant, without excessive evening fall of temperature, and in winter is for the most part sunny, the snow remaining on the ground the whole season. Several sanatoria have been erected here, the oldest being the one till recently under Dr. Adolf Koch. There is a Protestant church in the village, but no Roman Catholic service.

THE SCHÖMBERG SANATORIUM

was originally a convalescent home, but has been rebuilt. It is *situated* on the southern slope of a hill in the midst of the village. *Stations*: Höfen, Liebenzell. *Grounds*: $1\frac{1}{2}$ hectares.

Buildings: A large four-story building, with a deep verandah along the south side and balconies to every upper floor but the topmost. In the basement are douche-rooms, laundry and disinfector, and kitchen quarters. On the ground floor, the dining-hall and several other common rooms. The bedrooms are all on the south side, decorated in the usual style, ventilated by air-shafts and fan-lights. *Cubic space*: 60 to 80 cubic metres. *Heating* by low-pressure steam; *lighting* by benzine incandescent lamps or petroleum. The chief medical officer lives in a separate house.

Staff: Includes two physicians, one male and one female nurse.

THE SCHÖMBERG NEW SANATORIUM

is *situated* in 6 acres of ground on a high plateau, surrounded by pine-woods.

Buildings: A five-story building with verandahs or balconies to every floor. The administration is in the basement, a covered walk for patients running in front of it. Dining-room on the ground floor, reaching from front to back; the rest of this floor being occupied by other day rooms and the bathrooms. The bedrooms

occupy the upper floors, front and back. Decorations as usual in a sanatorium. *Heating* by low-pressure steam; *lighting* by incandescent gas burners (Phœbus system). W.C.'s and staircases are in projecting pavilions to the north. Rest-shelters in the woods. The *staff* includes three physicians and three nurses.

THE SCHWARZWALDHEIM

is *situated* in the village, well protected by mountains. *Grounds*: 2 hectares of garden next the sanatorium, and 2 hectares of woodland a little distance up the mountain side. Large rest-shelters have been erected in both these places.

Buildings: A large four-story building with a wing at the eastern end at right angles to the main mass. The ground floor consists chiefly of large common rooms, and the administration rooms. The dining-saloon is built out into the garden. The three upper floors have seventy bedrooms, arranged on both sides of the corridors, mostly supplied with balconies, and finished in approved sanatorium style. The windows are wide enough to allow of the bed being drawn out on to the balcony. The consulting-rooms, douche-rooms, and waiting-rooms are on the first floor of the wing. *Heating* is by low-pressure steam; the balconies are also heated in winter. *Lighting* by electricity.

4. Other Sanatoria in Wurtemberg.

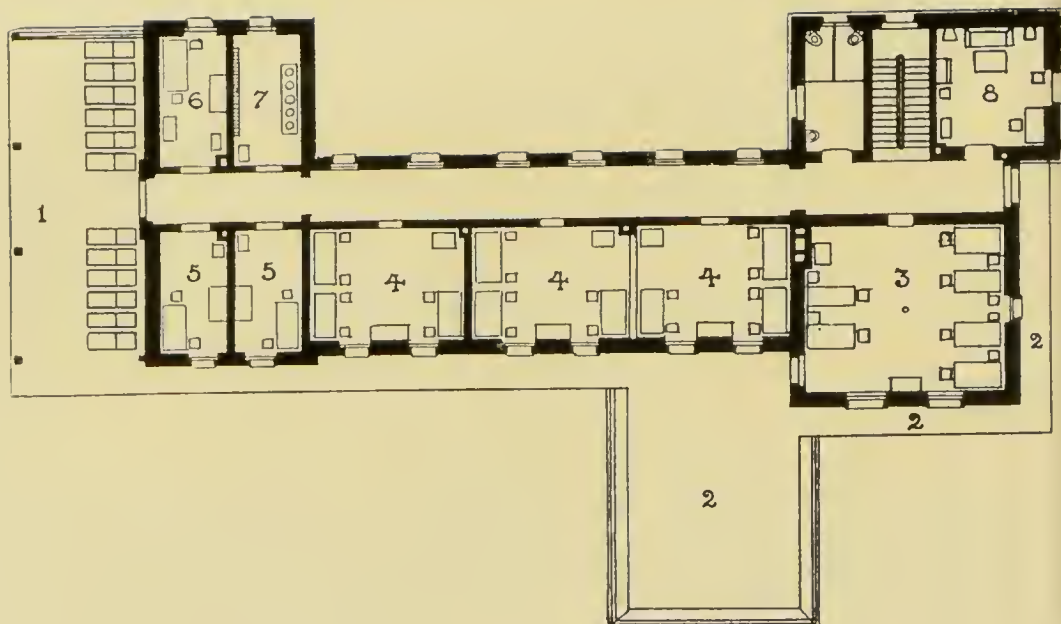
THE WILHELMSHEIM,

Schiffraim, belonging to the Wurtemberg Insurance Company, is *situated* in the Black Forest on a terrace on the steep southern slopes of the Löwenstein Mountains, overlooking the Murrthal. Well protected by woods and hills to the north and east, fairly well to the west. *Station*: Oppenweiler. *Altitude*: 435 metres.

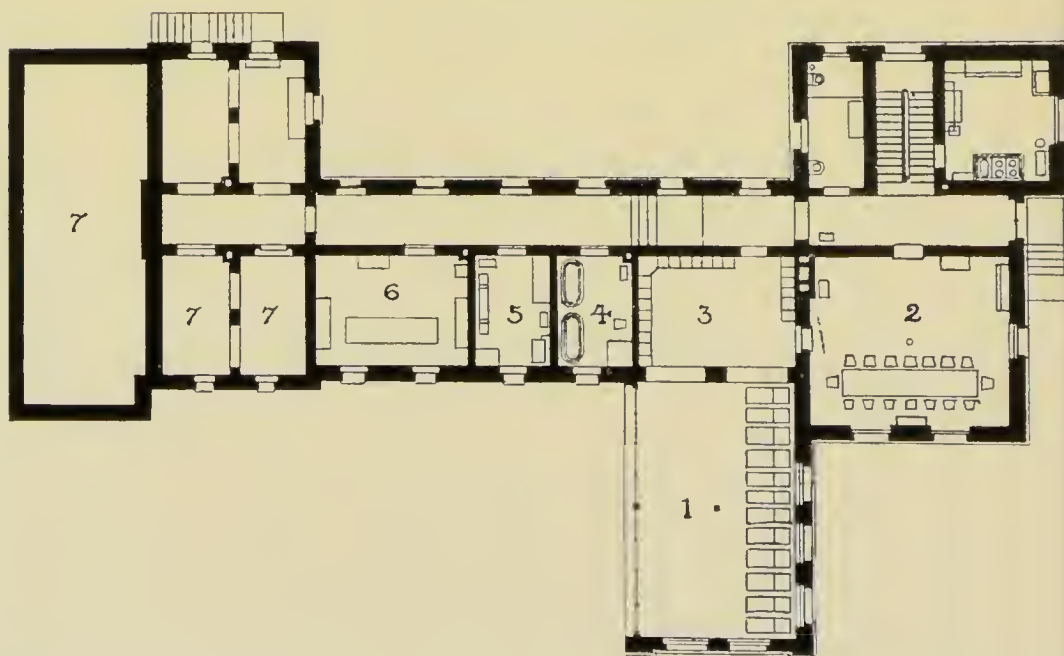
Buildings: The main building is of four stories. There is a separate doctor's house to the north-west.

UEBERRUH SANATORIUM,

Isny, also belongs to the Wurtemberg Insurance Company.



FIRST FLOOR



GROUND FLOOR

FIG. 34.—THE DANNENFELS SANATORIUM

Ground Floor :—

1. Fresh-air Gallery
2. Dining Saloon
3. Sitting Room
4. Bathroom

5. Consulting Room
6. Ironing Room
7. Cellars
N.E. corner, Kitchen

First Floor :—

1. Fresh-air Gallery
2. Open Platform
3. Room for six Beds
4. Rooms for three Beds apiece

5. Single-bedded Rooms
6. Nurses' Room
7. Lavatory
8. Office

THE BÖBLINGEN SANATORIUM

is intended for cases of surgical tuberculosis. It is *situated* about 18 kilometres from Stuttgart, surrounded by woods. *Grounds*: 9½ acres.

The *building* is a handsome pile of four stories with two towers. It consists of a central portion with two wings, the eastern of which slopes south-east, the western to the north-west. The kitchen with dining-room above are in the west wing. The entrance is at the eastern end. The back of the eastern wing contains an operating-room, laboratory, etc. A detached part of the east wing, separated by the grand staircase, is for children. There are verandahs and balconies to most of the floors. The bedrooms are mostly single-bedded.

5. Sanatoria in Bavaria.

THE DANNENFELS SANATORIUM

was *opened* by the Badische Anilin und Soda Fabrik of Ludwigs-hafen for their own workpeople.

Situation: At the foot of the Donnerberg, protected by woods to the north. *Station*: Kirchheimbolanden, 7.4 km. *Grounds*: 25 hectares, partly meadow and garden, partly chestnut woods. *Altitude*: 400 metres.

Buildings: The eastern end is a three-story pavilion (fig. 34), with a ground floor, first and second floors and attics. From this extends a long two-story prolongation, consisting of a single row of rooms on each floor, with a corridor along the northern side, and surrounded on the east, south and west by a balcony with two fresh-air resting-places on a level with the first floor. One of these resting-places (which has no roof) extends southwards over a built-out pavilion near the eastern end, ten metres long by six wide. Under it is another shelter open to the west, and with windows to south and east, for use in cold weather. The other first-floor shelter is somewhat larger, and occupies the western end of the building, on a level with the garden. The ground floor contains, in addition to the cold weather pavilion, a large dining-room at the eastern end, a day room, bathroom, doctor's room, ironing-room and cellars; and on

the northern side the kitchen and administrative rooms at either end of the house. The first floor contains patients' rooms along the south side: office, staircase, lavatories, closets, and nurses' rooms on the northern side. On the second floor of the eastern end are two rooms for the matron and a reserve room; the attics being occupied by additional administrative rooms. The patients sleep six in one ward, three each in three other wards, and three in single-bedded rooms.

THE PLANEgg SANATORIUM

owes its existence mainly to the advocacy of Prof. v. Ziemssen.

It is *situated* in a well-wooded neighbourhood about two hours by rail from Munich on the Starnberg railway line. *Soil*: gravel. *Altitude*: 557 metres. *Grounds*: 16½ hectares, laid out in a variety of paths.

Buildings: A main building with diverging wings running north-east and north-west respectively, connected by a subterranean passage with another building to the north. The main building is of three stories and has the kitchen department in the basement, dining-saloon, day rooms, and fresh-air galleries on the ground floor, and behind these the main entrance, rooms for the house-master and for visitors, W.C.'s and rooms for clean and dirty linen. Behind the western wing are rooms for the sisters, and in the angle between the centre and the wing one of the staircases and a Roman Catholic chapel. Behind the eastern wing are the medical department, bath- and douche-rooms, and in the angle another staircase and a Protestant chapel. On the two next floors are the patients' rooms on the south side; a committee room, ward-kitchen, lavatory, W.C.'s and linen rooms on the north side. *Cubic space*: 38 cubic metres. Most of the wards have four or five beds apiece; eight single-bedded. *Heating* by low-pressure steam. *Lighting* by electricity. To prevent the entrance of cellar air into the upper floors there are no cellars under the parts occupied by the patients, and the cellar stairs lead into the open air.

The separate building to the north is for power-house, laundry, disinfectory, mortuary, workshop and men's quarters.

Staff: A medical director and ten nursing sisters.

THE HARLACHING SANATORIUM,

originally built by the Munich town council as a convalescent home, but now chiefly devoted to female tuberculous patients.

Situation : In 10 hectares of ground, surrounded by woods to the south-east and west. *Stations* : Gross-Hesseloh, 3 km. ; Talkirchen, 3 km.

Buildings : The main building consists of three stories with basement underneath for heating apparatus and cellars. The entrance is in the centre of the north side ; near to it are reception rooms, an office, a transverse corridor leading to the wards, and then the double staircase. Farther south is a projection containing cloak-rooms and day rooms for men and women respectively, and a smoking room. Over this are reading-rooms, sisters' rooms, and a chapel and saloon for Protestant worship. Wards with twenty beds each and rest-shelters on the south side run on each floor towards the wings ; these also project southwards and contain a twelve-bedded room on each floor, a nurses' room, a subsidiary staircase, and on the north side W.C.'s and bathrooms separated by a ward kitchen. At the southern extremity of the wings are some isolation rooms. Separate passenger lifts have been provided, as well as food lifts. The floors are *betonirt* and covered with linoleum ; ventilating shafts are provided in the wards, ending in the chimneys above the roof. *Heating* is by low-pressure steam ; *lighting* by electricity.

A large separate administration block has been provided to the north, sufficient eventually for 500 patients. It contains a large kitchen, scullery, dining-room for the sisters, doctor's room, laboratory, drug-room and porter's bedroom. On the upper floor are twenty rooms for the house master, physician, and three assistant physicians, and in a separate portion for the nurses. The food is drawn by mechanical means through a subterranean passage to the dining-room in the basement of the main block. Servants are lodged in the wings of the administration block. In another building are the laundry, steam disinfector, and quarters for the engineer and his mate. Non-tuberculous patients are admitted into a separate part of the building.

Staff : There are three physicians.

THE ENGELTHAL SANATORIUM,

Hersbrück, is *situated* in large grounds with vegetable and flower gardens. *Station* : Herzenfelde.

The *building* consists of ground floor, first and second floors, with basement for disinfector, laundry, engines and douche-room, and attics for the servants. The centre and ends project slightly back and front. In the centre of the ground floor are the consulting rooms and laboratory in front, the entrance, reception-rooms and staircases behind; above are the quarters of the doctor and nurses. At the eastern end on the ground floor is a large day room, and over it the dining-saloon. The kitchen block is behind this wing. There are lavatories, W.C.'s and bathrooms to the north of each of the projecting parts, those in the centre being for the staff. Low-pressure steam *heating*, electric *lighting*, and high-pressure water supply have been provided; also a Röntgen-ray apparatus. The wards contain from one to six beds, mostly three or four, those with fewest beds being on the ground floor. In front of one wing on the terrace is a rest-shelter with windows at the back; in front of the other the stairs leading to the day room from the grounds.

THE LUITPOLDHEIM SANATORIUM,

at Lohr, for Lower Franconia, is *situated* in the Lichterwald, in the Spessart district, famous for its extensive forests of oak and beech.

The *building* has in the basement the kitchen department and laundry. On the ground floor a dining-room for the men at one end and one for the women at the other, with laboratory, consulting- and drug-room between, and bathrooms and rooms for servants behind. The fresh-air verandahs diverge from the ends next the dining-rooms, each forming an obtuse angle with the front of the building. On the two upper floors there are nurses' and linen rooms behind, and bedrooms in front, some single-bedded, some for three, others for four beds each.

THE SCHÖNSTETT SANATORIUM,

near Endorf, was erected by a Munich Sick Benefit Society for its own members.

THE KIRCHSEEON SANATORIUM

was also erected by a Munich Sick Benefit Society.

THE FÜRTH SANATORIUM,

near Weiherhof, was opened by the town council of Fürth.

THE PFALZ SANATORIUM,

near Albersweiler, is the property of the Pfalz Insurance Company in Speyer.

THE BISCHOFSGRÜN SANATORIUM

is for Upper Franconia.

THE HAUSTEIN SANATORIUM,

Deggendorf, is intended for members of the middle classes in Bavaria.

SECTION X.—ITALY.

CHAPTER LX.

ITALY.

THERE is in this country a National Association for Prevention of Tuberculosis, with many branches ; also a Parliamentary Committee for Sanatoria, which was instituted by Prof. Baccelli. A wonderful amount of work has been done during the last few years in reducing Italian tuberculosis mortality, which is among the lowest in Europe. Dispensaries are projected, erected, or in existence in all the larger towns of Italy. Most of the public hospitals in these towns have special wards or pavilions for tuberculous cases. Sanatoria, however, are comparatively few in number, and have been left chiefly to private initiative. There are forty-one sea side hospitals for tuberculous children in existence, and another is being constructed, the total of beds available amounting to 6500. About twelve cities have open-air schools and eight more are to be opened soon, with a total of 1000 places. There are also thirty alpine colonies for children predisposed to tubercle.

In addition to the institutions mentioned in the following table, there are wards or pavilions for the tuberculous in the Milanese Hospitals, Maggiore, Fatebenefratelli and Fatebenesorelle ; the Maggiore in Cernusco ; at Genoa for advanced cases in the Civile and the Galliera Hospitals, for early cases in the San Martino and San Raffaele Hospitals. Hospitals for tuberculosis are in construction or projected in Pallanza, Castiglione delle Stiviere, Palermo, Verona, Novara, Viterbo, Girgenti, Padua, Alessandria and Cuneo, while funds have also been raised for the purpose at Florence, Piazza Armerina, Catania, Voghera, and Caltagirone.

Name and Locality.	Opened.	Medical Officers.	Cases Admitted.	Beds.
Pop. San., Prasomaso	1912	For Milan	E., m., w.	100
San. of Ornago	1910	Dr. Banfi (private)	E., w.	28
" Sondalo	1901	Dr. Zubiani	Full price	60
Pianosa San.	1906	Prison Sanatorium	Crim.	—
Montesarchio San.	in con.	" "	"	—
Hosp. Amedeo, Turin	—	—	—	100
" San. Luigi, "	1818	—	A.	174
" " Orbassano, "	1909	—	—	200
" Villa Pizzone, Milan	in con.	—	A.	320
" M. in Cernusco	—	—	E.	160
" Sta Maria della Gracia, Venice	1906	—	—	130
" " " " "	—	—	Paying	—
San. Umberto I, Leghorn	—	{ Dr. Passini. Two sections, hosp. and san. }	Poor	80
" " " "	—		Paying	30
Hosp. of Bonifacio, Florence	—	—	A., m.	58
" " "	—	—	A., w.	29
" " "	1898	—	E.	—
Hosp. Pavilion, "	proj.	—	—	—
" San. of Budrio, Bologna	—	—	A.	70
New Hosp., "	1911	—	—	—
Hospice Umberto I, Rome	1905	Dr. A. Angelini	All forms	450
Hosp. San., Catania	—	—	—	18
" Pavilion, Sondrio	—	In con. with Civil hosp.	—	—
" " Rovigo	—	—	m., w.	22
Hosp., Pisa	in con.	—	m., w.	100
" Naples	proj.	—	—	600

THE MILANESE POPULAR SANATORIUM,

at Prasomaso, is *situated* in the Valtelline in a pine-wood 1250 metres above sea level, overlooking the valley of the Adda. It consists of four buildings; one for the patients, one for the medical director, a third for the general services, and another forming the mortuary. The patients' building has two wings, one for each sex.

Terms: 4-7.50 lire; or free.

THE SANATORIUM OF ORNAGO,

in the province of Milan, near Vimercate, was founded by private subscriptions, and is *situated* in a pine-wood. There is an administration building of two stories over a basement which contains the kitchen department. Above this are the doctor's quarters

and dining-room, the sisters' and nurses' rooms being on the upper floor. On either side of this building are wings of one story, each containing three wards (one with two the others with six beds apiece). There is a rest-shelter in the woods.

The institution is free for inhabitants of the district.

THE KING HUMBERT I HOSPITAL,

at Rome, originally had five buildings, three for men, two for women with 250 beds in all, but a number of Ducker pavilions and others resembling them have been added. In the five original buildings there are twenty-four beds on the ground floor, twenty-two on the first floor, the latter reserved for the graver cases. *Cubic space* 43·4 cubic metres. The upper wards have a terrace at the south side of the house. There are also wooden chalets used as dining-rooms and recreation pavilions. A dispensary is attached to the hospital.

THE VENICE CONSUMPTION HOSPITAL

was originally an isolation hospital in the island of Sta Maria della Gracia, enlarged by the addition of Ducker shelters and new wards. One of these is intended for paying patients of modest means.

THE TURIN HOSPITAL SANATORIUM,

in the suburbs of the city, was founded by the Pious Foundation of San Luigi Gonzaga, and cost 1,450,000 frs., or 7250 per bed. The wards contain from one to five beds apiece. *Cubic space*: 30 to 60 cubic metres. Only the ground floor is in use owing to lack of funds. The patients come from the old city hospital.

THE MILAN CONSUMPTION HOSPITAL

being constructed at Villa Pizzoni will adjoin the hospital for chronic diseases. The hospital for consumptives is to consist of four pavilions, of which two will be of the sanatorium type with wards of from four to eight beds apiece, isolation single-bedded wards, lavatories with hot and cold water, dining-saloon, drawing-room.

rest-galleries, hydropathic installation, etc. In two other pavilions the graver cases will be received in wards with eleven beds apiece.

THE SONDALO SANATORIUM

is *situated* in a pine-wood near Sortenna, at an altitude of 1250 metres. It consists of three buildings forming the arc of a circle open to the south, united by two intermediate ones. The three floors of the lateral buildings and the two upper ones of the central structure contain bedrooms. The ground floor of the central building and of the two intermediate buildings contain the common rooms and administrative quarters. The dining-rooms, kitchens and annexes are placed in a special pavilion united to the central mass by a glazed passage. There are also laboratories, sanitary and disinfecting apparatus. An additional pavilion was added in 1910.

REFERENCES.—

See Gaetano Ronzoni, "Le moderne Istituzioni Antitubercolari in Italia": "VII Congr. Intern. Tub.," Rome, 1912.

F. Galli, "La lotta Sociale antitubercolare in Italia".

SECTION XI.—PORTUGAL, SPAIN, AND THEIR COLONIES.

CHAPTER LXI.

PORTUGAL.

IN this country there are a number of institutions on the coast for the treatment of surgical tuberculosis in children, and a few for adults suffering from pulmonary tuberculosis. Nearly all the hospitals have wards or pavilions for this disease. Dispensaries have been opened at Lisbon, Oporto, Faro, Vianna do Castello, Braganza, and Figueira da Foz, the latter for the very poor. The Lisbon Dispensary is a beautifully finished building with rounded angles and other modern features.

Summer colonies have been opened at the Carcavellos and Outão Sanatoria for 180 children, at Figueira da Foz (for the scrofulous children of Coimbra), others at Oeiras under the Misericordia of Lisbon, bathing establishments at Trafaria for the sickly children of Lisbon, at Mount Estoril, and in connexion with the Azile d'Azuda. Open-air schools are attached to the Oporto and the Lisbon Hospitals for Tuberculosis.

A national league against tuberculosis was founded in 1899, and in 1902 a society for helping the tuberculous (Assistencia Nacional aos Tuberculosos) which gives grants in aid to some of the above-mentioned institutions.¹

THE SOUZA MARTINS SANATORIUM

stands 1000 metres above sea level. It consists of three pavilions with twenty-eight beds apiece, one hospital block for intercurrent diseases, laundry, disinfector, and six cottages which can be let to wealthy families.

¹ See "Trans. Intern. Tub. Conference," 1909, 1910, 1912.

PORTUGUESE SANATORIA.

Name and Locality.	Opened.	Cases Admitted.	Beds.
Souza Martins San., Guarda	1907	E.	132
Sant' Anna San., Parede	—	S., g.	180
Silva Maia San., Villa Nova de Famalicão	—	S., c.	—
San. of Seixosco, Lixa	—	Full price	—
„ Covilha (Gd. Hôt. of Herminios)	—	„	—
Mountain Pension, Teixoso near Covilha	—	„	—
Portalegre Hosp.	—	—	20
Don Carlos „ Lisbon	—	E.	120
Popular San., „	—	E.	64
Don Manuel Hosp., Oporto	—	—	—
Gelfa San., Caminha	—	S., b., g.	60
Mont Estoril San.	—	S.	18
Maritime Hosp., Outão	1900	S., g.	166
„ „ Carcavellos	1902	S., b.	96
„ „ „ lazaret	—	—	6
„ „ Caminha	planned	—	—
Coimbra „	„	—	—
Braga „	„	—	—
Convalescent Hosp., Lisbon	1862	m., w.	32

THE SANT' ANNA SANATORIUM

is intended for poor girls aged four to twelve, and consists of three wings, each for sixty beds. It is a private institution.

THE MONT ESTORIL SANATORIUM

was originally a bathing establishment for poor children, founded and supported by the pianist, Rey Collaço, and recently handed over by him to the Assistencia.

Madeira.

A comprehensive scheme for sanatoria and health resorts was inaugurated for Madeira in 1900. A German Committee, of which Prince Hohenlohe is President, had a concession granted by the Portuguese Government for the erection of the necessary buildings, etc., on condition that 20 per cent of the patients should be Portuguese, who were to be received free of charge. The Government agreed to make no customs charges on the material, provided that 500,000 frs. were paid down as deposit. Drs. Fränkel and Pannwitz

of Berlin (the Secretary-General of the Berlin Tuberculosis Association) visited the island together with Dr. Lancastre, Physician-in-Ordinary to the Queen of Portugal, to find the best site. The syndicate had a capital of 40,000,000 marks, and proposed to erect a theatre, a circus and hotels, and to lay out parks and pleasure grounds and establish a steamship service between Madeira and Italy. There were to be two sanatoria on the sea-coast and two in the mountains. The first of these sanatoria was opened early in 1905 at a height of 300 metres above sea level, with sixty beds for patients.¹

¹ "Lancet," 5 Dec., 1900; "Brit. Med. Journal," 18 Feb., 1905.

CHAPTER LXII.

SPAIN.

AN Antituberculosis Association was founded in this country in 1902. The first dispensary for the tuberculous was opened in Madrid in 1903 by Verdes Montenegro. It has a clinical laboratory, X-ray department, and a complete apparatus for disinfecting clothes, and is maintained by the municipality and other public bodies.¹

There are now three tuberculosis dispensaries at Madrid, two at Barcelona, and one in nearly every other large town or city, to the total number of fourteen.

SPANISH SANATORIA.

Name and Locality.	Opened.	Terms in Pesetas per Day.	Medical Officers.	Cases Admitted.	Beds.
San. de Tarrasa	1911	4	—	E.,m.,w.,c.	30 ²
„ San Sebastian	1912	1500 per annum	—	E.,m.,w.,c.	40
„ Oza (Coruña)	1910	1'50	Maritime	E.,m.,w.,c.	150
„ Pedrosa (Santander)	1910	1'50	„	E., c.	224
„ „ „	1910	1'50	—	E.,m., w.	13
San. Catalan (Santa Maria de Olost)	1910	3-15	—	E.,m.,w.,c.	60
San. de Pamplona	in con.	—	—	E.,m., w.	44
„ Santa Clara (Chipiona)	1901	free	—	E., b., g.	60
Hosp. of San Jose and Sant Adela	1912	„	—	E.,m.,w.,c.	60
Granja San., Torre Bonica	1912	„	—	—	—
Roncevalles San.	in con.	—	—	—	—
Dr. Latour's San., Cadiz	—	—	—	c.	—
Porta Coeli San., Valencia	1903	—	—	—	—
Santa Catalina San. (Canaries)	—	—	—	—	—
Guimar Hotel „ „	—	—	—	—	—

¹ "Brit. Med. Journal," 9 May, 1903.

² Eventually to be 100.

PORTA COELI SANATORIUM,

near Valencia, originally a convent belonging to the Carthusians, dating from the thirteenth century, was converted in 1903 into a sanatorium for consumptives, mainly through the exertions of Dr. Moliner. The Queen Regent of Spain accepted the Protectorate, and help was obtained from Spanish students, workmen's unions, etc., with a State subvention of 200,000 pesetas. There are two large sleeping pavilions on a terrace with southerly aspect, surrounded by an amphitheatre of pine-clad mountains. Behind is the Sierra de Maquera. The *soil* is Trias; *altitude* 360 metres.

Ten free beds are reserved for Germans; there are some beds for full-price patients.¹

The Canary Islands.

In addition to one or two hotels which cater for invalids, there are sanatoria at Santa Catalina and at Guimar, each of which has an English doctor. The Hotel Metropole overlooking the harbour of Las Palmas, and the Hotel Santa Brigida at Monte keep trained nurses in residence.

THE SANTA CATALINA SANATORIUM

was designed by Mr. A. J. Maclaren, himself originally a sufferer from pulmonary tuberculosis. It belongs to a company, and is managed by Mr. and Mrs. Sauerbrei, the latter of whom is an English-trained nurse and hospital sister. Another trained nurse is kept in the place, and a third during the winter months. Medical officers: Dr. Brian Melland and Dr. Fleming Baxter. The place consists partly of an hotel for convalescents and pleasure seekers, partly of a sanatorium for consumptives who occupy a separate wing and are said to be treated strictly on Nordrach lines. The grounds (eighteen acres) reach from the sea level to 76 metres above the sanatorium. At this height is a bare tableland with golf links, which extend to 150 metres above sea-level. North and south of the grounds is farmland with very few roads or habitations. The public roads are dusty in hot weather, but can easily

¹ Domine, "Berlin Tuberculosis Congress," 1899.

be avoided. For 240 days annually the north-east trade winds blow direct on to the sanatorium.

The *building* is planned on the model of Falkenstein, but with three stories instead of five, and a less cramped kitchen department. The concavity looks east-north-east. The dining-room, billiard-room and smoking-room occupy the northern wing on the ground floor. In the central part are a large entrance hall and reception-rooms in front of the corridor, and smaller rooms behind it. Verandahs and balconies surround both wings on the two lower floors and line the eastern side of the centre. The top floor leads on to large terraces over the wings which are partially covered with roofing. The servants are quartered in a separate block to the north-west. The south wing, containing twenty out of the eighty bedrooms, is set aside for those requiring Nordrach treatment. In this wing there is a separate dining-room without windows. The floors are polished, with a few small slips of carpet ; walls whitewashed ; French windows with large square fanlights ; extra large windows to all the common rooms ; louvre shutters to all outside doors and windows. Electric lighting ; water supply and sewage those of Las Palmas. Milk from a herd living in the open is sterilized before use.

Terms : Five guineas or less ; medical attendance extra.

THE GUIMAR HOTEL,

is twenty miles south of Santa Cruz, 366 metres above sea level, commanding an extensive view over mountains and sea. The pretty village of Guimar is some 65 metres lower down ; and towering above it to the south-west is the Peak of Teneriffe, which rises to 3700 metres above sea level. The surrounding district is well wooded, and supplies Orotava, Santa Cruz and Laguna with their earliest and best fruit. There are a croquet lawn and bowling green at the hospital ; also a billiard room and dark room.

Physicians : Drs. Stanford Harris and J. Campbell Graham.

Terms : Five guineas inclusive.

SECTION XII.—RUSSIA.

CHAPTER LXIII.

THERE has been great activity in Russia recently as regards public measures for the suppression of tuberculosis. At the last meeting of the International Tuberculosis Conference in Rome in April, 1912, Wladimiroff stated that the number of Antituberculosis Societies in Russia had increased since 1910 from eighteen to ninety-eight, of which seventy were affiliated to the Central League, and that there were then at least seventeen dispensaries open, and about as many more to be opened shortly.

Many new sanatoria have been opened and a number of others are projected. The case of tuberculous or predisposed children has been especially attended to. I regret that it has been impossible to obtain details or a complete list of all these institutions in time for this edition.

The National League, which became the centre of all this activity, and combined a large proportion of the various local societies, met for the first time in St. Petersburg in 1910, under the presidency of Dr. Leon Berthenson. The home of the Central League is in Moscow.

Finland

was early in the field in combating tuberculosis. Resolutions on the subject, calling for State help, were passed at the Finland Medical Society in 1889, and raised in the Finnish Parliament in 1891 and 1897, and a special commission appointed in the following year. In 1905 an Antituberculosis Association was founded, which has an annual tuberculosis day on which a special stamp is

Name and Locality.	Opened.	Terms in Roubles or Marks.	Medical Officers.	Cases Ad- mitted.	Beds.
FINLAND—					
Imp. San., Halila	—	—	—	—	—
Alexander	1891	{ 25 R. to 75 R. per month, some F. }	Dr. Gabrilovitsch	E.	32
Maria	1893		—	E., c.	25
Nikolaj, Novajakirka	1895		—	Mil.	120
Evangelical San., Pitkäjärvi	1898	75 or F.	Dr. A. v. Pezold	E.	28
Guards San. „	1910	—	{ Dr. v. Unterberger, Dr. A. Jahn	E.	50
Teriöki San.	1909	—	—	P. S., c.	30
Nummela San., Røykka	1903	2-15 m.p.d. or F.	Dr. A. v. Bonsdorff	E.	70
Takaharju San., Nyslott	1906	3-7 m. or F.	Dr. K. Brux	E.	100
Högsand San., Lappvik	1901	1 m. and F.	Dr. R. Gardberg	S., c.	30
Helsingfors Hosp.	—	—	—	—	—
Children's Colony, Arens- burg	—	—	—	—	—
Preventorium, Arensburg	—	—	Dr. Arnd	E., c.	60
ST. PETERSBURG—					
Zarskoje Sselo San.	1904	—	Dr. Dombrowsky	S., c.	44
„ Military San.	—	—	—	All	—
Taitzi San., Maria Sect.	1895	{ 40 to 60 R. or free }	—	E., w.	20
„ George Sect.	1897		—	E., m.	20
„ Third Sect.	1900		—	E.	10
Conv. Home, Oranienbaum	—	—	Dr. Bohl	E., c.	35
ESTHONIA—					
Preventorium	1909	—	—	E., c.	—
Sanatorium near Revel	—	—	—	E., A.	—
Children's Colony „	—	—	—	c.	—
LIVONIA—					
Dorpat San.	—	—	(Poorer Middle Class)	All	—
Preventorium	1910	—	—	E., c.	—
Riga San.	in con.	—	—	E.	—
COURLAND—					
Seaside San., Windau	—	—	—	S., c.	—
VITEBSK—					
Dunaburg Evang. Hosp.	—	—	—	—	—
VILNA—					
N.W. Railway San.	1910	—	—	E.	30
POLAND—					
Otwozk San.	1893	3'15-3'90 R. p. d.	Dr. J. Geisler	E.	31
Lodz Preventorium	1910	—	—	E., c.	—
Rudka San.	1909	—	—	E.	—
Mrösy near Warsaw	1906	—	—	E.	120
Vola Hosp. dept.	—	F.	Dr. Natanson	—	—
KIEFF—					
Jewish Hosp. San., Bojarka	1899	F.	Founded by M. Gal- perin	E.	—
San., Kieff	1906	50 R.	—	—	100
KHERSON—					
Odessa San. Colonies	1910	—	—	c.	—
BESSARABIA—					
Children's San.	—	—	—	Poor ch.	—

Name and Locality.	Opened.	Terms in Roubles or Marks.	Medical Officers.	Cases Ad- mitted.	Beds.
CRIMEA—					
Gastria San., Yalta	1900	125-220 R. p. m.	Dr. Lebedev	E.	24
Doctors' San., Yalta	in con.	—	—	—	—
Charitable San., „	—	F.	—	Very Poor	—
Balaclava San., „	1903	40-90 R. or F.	See "Tuberculosis," Jan. 1904	Private	17
Red Cross San., „	1909	75 R.	—	Poor	40
Children's Colony, „	—	—	—	—	—
Bobroff San., Alupka	1902	—	—	P. S., c.	100
Emp. Alexander San., Massandra	1901	40 R. or F.	—	E.	30
Quisisana	1886	80-100 R.	Dr. F. D. Weber	E., Priv.	30
Alushta	—	—	Dr. Somow	Private	200
POLTAVA—					
Pop. San.	proj.	—	"Tr. Int. Tub. Conf.," 1910	—	—
KHARKOF—					
Children's Colony, Slavjansk	—	—	—	—	—
MOSCOW—					
Bronitzky San.	1909	—	Erected by Zemstwo	E.	—
Bachruschin Hosp. Pav.	1909	—	—	A., w.	—
Tichwinskiye San.	—	—	(Rachmanov)	m.	350
Ryetchiza Hosp.	—	—	—	w.	150
TVER—					
Knäschji-Gory San.	—	—	—	Poor Women	—
NOVGOROD—					
Children's Colony, Staraja Rossa	—	—	—	—	—
PERM—					
Tuberculosis Home	1910	—	Erected by Zemstwo	A.	—
VOLOGDA—					
Sanatorium	—	—	—	—	100
SAMARA—					
Printers' San.	—	—	"Tr. Int. Tub. Conf.," 1909	—	—
CAUCASUS—					
Gulripsch San., Suchum Kale	1902	40-50	Dr. Jemeljanov	E.	100
Gagry San.	1904	100-150	Dr. Schapschal	E.	50
Abas Touman San.	proj.	Pop. San.	"Tr. Int. Tub. Conf.," 1910	—	—
Black Sea San., Gelend- schick	—	90-110	Dr. M. F. Sulchinsky	Private	—
Students' San., Pjatorsk	—	—	—	Poor	—
Ssotchi San.	—	—	—	Artisans	—
Alushta San.	—	—	For Customs Officials	—	200
SIBERIA—					
Tomsk San.	—	—	—	—	—
Port Arthur San.	—	—	—	—	—
Poloschnaja San.	—	—	—	—	—

issued. The earliest sanatoria in Finland were founded through the exertions of the medical profession.

It has a population of about three millions, and a lower mortality from tuberculosis than any other country excepting Great Britain.

NUMMELA SANATORIUM,

near Helsingfors, in South-west Finland, was founded by the Finnish Medical Society, with the help of a State subvention, in return for which a certain number of beds were set aside for poor patients at very low fees. The *grounds*, of 60 hectares, were given by the State on a gravel hill near Lake Saaksjarvi, near the railway to Hango.

The *buildings* are of stone, and consist of a fine main structure of three stories over a basement, with wooden fresh-air galleries in two tiers at the ends.

TAKAHARJU SANATORIUM

is in Northern Finland, near Lake Saima and the railway to Nyslott, and was founded by the Duodecim Society of Medical Men. The *grounds*, of 35 hectares, were given by the State. *Soil*: Gravel.¹

HÖGSAND SANATORIUM,

Lappvik, is in South-west Finland, on the coast near Hango. This institution was also erected by medical men with the help of Government. It is intended for scrupulous children without means. Twenty-two out of the thirty beds are free. It is open during the summer months.

Another similar institution is projected in Northern Finland.¹

A SANATORIUM FOR THE POOR

was being built by the Government in North-west Finland in 1908.¹

HELSINGFORS HOSPITAL

for tuberculous patients has associated with itself a nursing home and a dispensary on the French model.¹

¹ Palmberg, "Brit. Journal of Tuberculosis," April, 1908.

THE HALILA SANATORIUM.

Originally founded by Dr. Dittmann as a private sanatorium in 1889, bought by the Russian Government in 1891 for a low-price sanatorium, by command of the Emperor Alexander III. *Grounds*: 1000 hectares of wood and moorland near the Halila Lake. *Altitude*: 200 metres.

Buildings: Some twenty separate buildings, including three sanatoria under common management, described below.

THE ALEXANDER SANATORIUM

is a T shaped structure of two stories, built of wood on a granite foundation. Most of the rooms are east and west of a wide corridor which leads on to an open south verandah, or on to balconies above it. Walls matchboarded and varnished; linoleum on floors, furniture of white enamelled pinewood. *Cubic space*: 198 cubic metres. There are also winter and summer dining-rooms, music-room, reading-room, billiard-room, two bathrooms, douche-room, consulting-room, a laboratory with chemical, bacteriological, histological, and microphotographic apparatus, north and south balconies. *Heating* by Swedish porcelain stoves with chimney shafts. *Lighting* by electricity. Water-closets of English pattern; sewage purified by filtration through sphagnum, the solids put upon the fields. The kitchen department is united with the main structure by a warm corridor.

THE MARIA SANATORIUM

is intended for predisposed girls, chiefly from the schools for the nobility.

Buildings: Like the preceding, but rooms for patients all on south side of a glazed corridor, and furnished rather more luxuriously.

THE NIKOLAJ SANATORIUM

was built by the Grand Duchess Alexandra Jossefowna for the military classes.

The *building* is planned like Hohenhonnef Sanatorium (see p. 370), with three tiers of fresh-air galleries and diverging wings. Separate airshafts and electric fans for ventilation. *Heating* by low-pressure hot-water pipes. *Lighting* by electricity. The electric lighting, water supply and sewerage are in common with the other two sanatoria. Dirty linen put into numbered bags and sent down a shoot to the basement.

REFERENCE.—V. Pezold, "Zeitschr. f. Tuberk.," April, 1904.

PITKÄJÄRVI SANATORIUM

is *situated* $10\frac{1}{2}$ kilometres from Teriöki station on the Finland Railway. *Grounds*: $49\frac{1}{2}$ hectares. *Altitude*: 62 metres.

Buildings: Of two stories with basement. Nearly all the bedrooms are on the south side. Day-rooms, dining-room and administration are in two northerly projections, with consulting-rooms and quarters for doctors and maids over these. Bedrooms all single-bedded, men below and women above. Walls cemented and oil-painted. *Cubic space*, 56.6 cubic metres. *Heating* by closed stoves. Roomy balconies and verandahs occupy the centre of the south side.

REFERENCE.—"Zeitschr. f. Tuberk.," Jan., July and Oct., 1902.

TERIÖKI SANATORIUM

was founded by the St. Petersburg Society for the Care of Consumption, now called the Society for the Prevention of Tuberculosis.

It is *situated* two hours' rail from the capital, and has thirty beds for boys and girls with open pulmonary tuberculosis, and five for those with tuberculosis of the bones. The family Kloeber gave the ground for it and a donation of 23,000 roubles.

REFERENCE.—Wladimiroff, "International Tub. Conference," Sept., 1909.

THE GUARDS' SANATORIUM,

at Teriöki, overlooks a picturesque lake, and was erected at the expense of Grand Duke Michael Alexandrowitch. *Grounds*: 20 hectares.

Buildings: A three-story stone building with balconies and rest-galleries.

REFERENCE.—Wladimiroff, "Trans. Int. Tuberc. Conference," Oct., 1910; "Tuberculosis," Feb., 1910.

St. Petersburg.

THE TAITZI SANATORIUM,

near Gatschina, twenty-five miles from St. Petersburg, on the Baltic coast, was founded mainly through the instrumentality of a lady, Dr. R. Pavlovskaja, with the help of the chief society of Russian doctors in St. Petersburg. Imperial patronage was given, and nearly £50,000 contributed by the Emperor Nicholas II, as well as the land, the remaining capital being raised by private subscriptions. *Grounds* : 60 acres of arable land, gardens, meadows and woods. *Altitude* : 86 metres.

Buildings : Three separate sections for patients, of which the first to be opened—the *Maria section*—consists of an old stone castle, transformed for the purpose, and intended for women. Dr. Pavlovskaja describes it as architecturally beautiful but not perfectly suitable from a medical point of view. There is a solarium on the roof, and rest-galleries are placed at the four corners. Wards are one or two bedded, *Cubic space* : 48 cubic metres.

The *George section* is a rectangular two-story building with wards on the south side on each floor, and verandahs or balconies on the west, south and east. There are four wards with four beds each, five with two. In the centre of the first floor is a large dining-room. *Heating* by steam-pipes and closed stoves. *Lighting* by electricity.

REFERENCES.—

"Rev. de la Tub.," Oct., 1899.

"Zeitschr. f. Tuberk.," July, 1901 ; July, 1902 ; Jan., 1903.

CHILDREN'S SANATORIA.

A sanatorium was opened in 1904 at Zarskoje Sselo for children suffering from open pulmonary tuberculosis. Six summer playgrounds have been established near the city in which tuberculous children are received twice a week and supplied with milk and bread. Another, under the supervision of a doctor, is open daily. A "house sanatorium" for the winter months was opened in February, 1910, by Prof. v. Unterberger in one of the suburbs. It has

two small bed-sitting-rooms, each for four children, a waiting-room, dining-room, glass-protected verandah, and garden.¹

There is also a convalescent home at Oranienbaum not exclusively for consumptives but admitting early cases.

Vilna.

THE RAILWAY SANATORIUM.

This institution has been opened by the Administration of the N.W. Railways. It consists of a hospital section for 200 and a sanatorium section for early cases with thirty beds, and is situated on 12 hectares of hilly ground wooded with fir-trees.

The *building* is of wood, one story high, with wards for two to four beds apiece and a large verandah.²

Poland.

There are now antituberculosis societies in Warsaw and in Lodz, and a monthly paper on tuberculosis prevention is published in Polish. Dispensaries have been opened in various towns.

There is also a large sanatorium near Warsaw and a smaller private one at Otwozk, and a Preventorium for children at Lodz.

THE VOLA HOSPITAL,

at Warsaw, has a special department for consumptives organized by Dr. Natanson. The *grounds* are of 15 acres, the site being on a southerly slope.

Buildings are arranged in horseshoe shape. Bedrooms for one or two beds; walls glazed with porcelain, floors of similar material, corners rounded. *Heating* by closed stoves. Linen and bedroom slops are removed through special shafts to the basement, the former falling into an antiseptic bath.

REFERENCE.—Léon Petit, *loc. cit.*

¹ Wladimiroff, "Trans. Int. Tuberc. Conference," 1909; "Tuberculosis," April, 1910.

² "Tuberculosis," Feb., 1910.

³ Wladimiroff, "Trans. Int. Tuberculosis Conference," 1909, 1912.

THE RUDKA SANATORIUM

was founded by Dr. Theodore Dunin of Warsaw.

REFERENCE.—Wladimiroff, "Trans. Intern. Tuberculosis Conference," July, 1909.

Kherson.

ODESSA SANATORIUM COLONIES.

The society for the above colonies for poor scholars has started a section for the diagnosis and treatment of tuberculous diseases—i.e. has added treatment to prophylaxis.

Crimea.

Here are a number of antituberculosis institutions. Some, however, are not open in summer owing to the heat.

QUISISANA

is not exclusively for consumptives, but admits them in early stages.

Situation : In a suburb of Yalta, in a bay of the Black Sea coast, protected to the north, west, and partially to the east, by the Yaila Mountains, which rise to the height of 1500 metres.

Grounds : On the mountain side, with a terraced garden next to a wood of 7 acres. *Soil* : Slate, quartz, limestone, etc. *Altitude* : 61 metres.

Buildings : One of wood, the rest of stone.

REFERENCE.—"Zeitschr. f. Tuberk.," Feb. and Dec., 1902.

GASTRIA SANATORIUM

is 140 metres above sea level, stands in 3 hectares of ground, and has twenty-three rooms in two main buildings and two separate pavilions.

THE MASSANDRA SANATORIUM,

near Yalta, was originally a boarding-house for consumptives, opened in 1845 on the south coast of the Crimea by the Duchess Maria Bariatinsky, enlarged and converted into a true sanatorium by the

Emperor in 1899. *Grounds*: 20 hectares from the Imperial domains.

Buildings: Consist of eleven blocks, one of which is for severe cases, and another forms the main block. Nine pavilions contain from six to twelve beds apiece; they are of two stories, with the bedrooms to the south. These are single-bedded and have 52 to 78 cubic metres air space. In the larger houses there is a verandah of 101 cubic metres to every three rooms, and in the smaller ones a common verandah of 213 cubic metres. To the north are a room for the staff, bathrooms, and a room for cleansing spit-flasks. The floors are of painted wood (asphalt in the corridors, bathrooms and flask-room). Walls and ceilings are whitewashed. *Heating* is by low-pressure steam; electric *lighting*; and fixed basins with water laid on in each bedroom.

The main block contains the day rooms, dining-room, library, doctor's rooms, and overhead the nurses' quarters. In a separate building is the laundry with disinfector and machinery. There is also a lodge and a kitchen block with quarters for the staff. The sanatorium was opened by the Tsar and Tsarina in person.

Financial: Total cost at least 300,000 roubles. The land was valued at 400,000 roubles; endowment of 265,000 roubles. The Emperor personally contributed 50,000 roubles; 175,000 roubles were raised by voluntary subscriptions, the Minister of the Interior advanced 50,000 roubles for the main building, and the Government gives a yearly subsidy of 5000 roubles.

REFERENCE.—“*Zeitschr. f. Tuberk.*,” June, 1901; “*Tuberculosis*,” April, 1904.

THE DOCTORS' SANATORIUM

at Yalta is intended for doctors and medical students and their dependants of both sexes and was founded by the local medical society.

REFERENCE.—Wladimiroff, “*Trans. Int. Tuberculosis Conference*,” 1910.

Moscow.

There are several sanatoria in this province, and in Moscow itself a dispensary with a few observation beds.

THE MOSCOW SANATORIUM,

at Tichwinskoje, is the result of a gift of 200,000 roubles from the Rachmanow family. *Grounds*: 388 hectares, of which two-thirds are covered with very old pine-trees; it is traversed by a river.

Buildings: Five two-story stone buildings. Electric light; telephone to Warsaw; sewerage; a farm of fifty cows.

Not exclusively for consumptives.

REFERENCE.—“*Zeitschr. f. Tuberk.*,” Oct., 1901.

TULA TUBERCULOSIS MUSEUM.

This has been founded in connexion with a municipal dispensary.

REFERENCE.—Wladimiroff, “*Trans. Int. Tuberc. Conference*,” 1909.

The Caucasus.

A number of sanatoria have been erected in this province.

THE GAGRY SANATORIUM,

on the east coast of the Black Sea, is in a place which was a health resort in Greek and Roman times, for the revival of which 100,000 roubles were given in 1902 by the Ministry. Three zones were to be established, a seaside portion, a middle and an upper zone. The scheme was under the management of Prince v. Oldenburg. The *sanatorium* stands in forty acres of ground purchased by Dr. Schapschal, and was built at his expense.

Three *buildings*: A main two-story block, partly of wood, for patients of both sexes, a doctor's house and a kitchen block with dining-room attached.

REFERENCE.—

“*Zeitsch. f. Tuberk.*,” Oct., 1902.

“*Tuberculosis*,” Jan., 1904.

THE GELENDSCHICK SANATORIUM

is also on the east coast of the Black Sea, sheltered on the east, north and south by mountains rising to 600 metres.

SECTION XIII.—SWITZERLAND.

CHAPTER LXIV.

SWISS SANATORIA.

DURING the last few years a very complete organization has been made for combating tuberculosis in Switzerland, so that the mortality from this disease has fallen by about 25 per cent in ten years. There are now twelve popular sanatoria with a total of about 1000 beds, and about thirty more private sanatoria with over 2000 beds, besides pensions and hotels which receive slight cases of the disease in some of the health resorts. The first tuberculosis dispensary in Switzerland was opened at Neuchatel, the second in Bern. There are now institutions of the kind in every town besides a number in the country. Many of the hospitals have separate pavilions for the more severe cases. Numerous institutions and societies are engaged in prophylactic and curative work amongst children: sanatoria, school sanatoria, homes for delicate and tuberculous children, holiday colonies for about 5000 children, etc.

The cost of erection of popular sanatoria has been about £240 per bed. The cost of maintenance varies from 2·45 fr. to 4·71 fr. per day per head.

Most of the Swiss sanatoria are high above the sea level, and enjoy the advantage of an Alpine climate. Most of the private sanatoria, however, are not strict sanatoria in which the patient receives daily directions from the resident medical officer and supervision to see that the directions are carried out, but rather hotel-sanatoria in which the physician is consulted when it seems necessary to the patient. Many luxurious hotels receive tuberculous patients; but the arrangements are such as would suit healthy pleasure-seekers better than the tuberculous. Common rooms are habitually

overheated ; and patients may be tempted to stay in them listening to concerts or otherwise, when they should rather be out of doors. On the other hand, they enable the invalid to spend his time very pleasantly with his family and friends.

Five to seven meals a day are commonly provided. The charges mentioned in the tables are not quite inclusive, as a fee must usually be paid in the full-price sanatoria on admission and on departure, and heating, baths and some of the food may be extras. In the low-price sanatoria the fees are inclusive.

CHAPTER LXV.

CENTRAL AND WESTERN SWITZERLAND.

COMPRISING the Cantons of Aargau, Lucerne, Unterwalden, Valais, Berne, Soleure, Basel, Neuchatel, Friburg and Vaud.

Name and Locality.	Opened.	Terms in Francs per Day.	Medical Officers.	Cases Admitted.	Beds.
AARGAU—					
Barmelweid San.	in con.	—	For Aargau	—	—
LUCERNE—					
Popular San.	proj.	—	—	—	—
BASEL—					
In der Stille San., Davos	—	—	See p. 428	—	—
SOLEURE—					
Langenbrück San.	—	2-3	For Basel	c.	84
Allerheiligen „ Olten	1910	—	„ Soleure	E.	—
Erzenberg San., Langenbrück	—	—	Cheap middle-class	—	34
BERNE—					
Heiligenschwendi San.	1895	1.50	For Berne	E.	108
„ children's	1903	—	„	c.	42
Hartlisberg San., near Thun	—	—	Cheap middle-class	—	—
FRIBURG—					
Pop. San. Sciernes, Albeuve	proj.	—	For Friburg	—	—
NEUCHATEL—					
Malvilliers San.	1899	—	For Neuchatel	E., m.	22
VAUD—					
San. Grand Hotel, Leysin	1892	12-23	Dr. Jaquerod	E.	180
„ Mont Blanc „	1892	11½-16	Dr. Meyer	E.	140
„ de Chamossaire „	1901	8-13	Dr. Silbig	E.	140
„ Belvédère „	—	—	Dr. de Leyer	E.	—
„ Populaire „	1903	2-6	Dr. Burnand	E.	125 ¹
„ „ for children „	1903	—	Dr. Rollier	E., c.	80
English San., „	1907	11-	Dr. Hensler	E.	—
VALAIS—					
Clairmont San., Sierre	1903	3-7	For Geneva	E.	65
Montana „ „	1903	17-23	Dr. Stephani	E.	38
Beauregard „ „	1902	10-25	Dr. C. Fischer	E.	75

¹ To be 250 beds.
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THE HEILIGENSCHWENDI SANATORIUM

was opened to commemorate the 600th anniversary of the Swiss Confederacy, and the 700th of the City of Berne, and is intended primarily for the inhabitants of Berne and the canton. The Tuberculosis Commission for Freiburg maintains certain beds in this sanatorium. The sanatorium is about one and a half hours' walk from Thun, on an elevation overlooking the lake, with a lovely view of the Niesen, Jungfrau and the Alps. The *situation* is sheltered; the Blume Mountain lies to the north; wooded hills to the west.

The *building*, which faces south-south-west, consists of a central mass (fig. 35) united by covered corridors with two slightly projecting lateral pavilions, and a separate villa for the manager behind the eastern end. In front of the central block and the connecting corridors are the fresh-air galleries, which are glazed. In the central part is the dining-saloon, and on either side of it a common room. The former is for both sexes; but in other respects they are kept apart. The northern part of the central block contains the kitchen, etc. On the first floor are a few single-bedded rooms to the south, and over them a number of attic rooms. Both lateral pavilions have on the ground floor two large rooms with eight beds each, and windows on three sides, and a few smaller rooms for one or two beds apiece, and the same on the first floor. There is also an outbuilding behind the western corridor with laundry, disinfector, stables, etc. Recently a children's pavilion with forty beds has been added. The inner walls are painted with glossy oil paint; the floors are of simple washable parquet. *Heating* is by low-pressure hot-water pipes; *lighting* by electricity. The windows are very large, reaching down to the ground, the lower part being guarded by a grating. There are good baths, a good water supply, and "Unitas" W.C.'s; simple furniture, lounge chairs in two parts. None but consumptives are admitted. Patients do a little work in the establishment; also sledging in winter.

Staff: A manager, matron, and trained nurses.

Financial: The building cost £216 per bed for the first fifty-two beds.



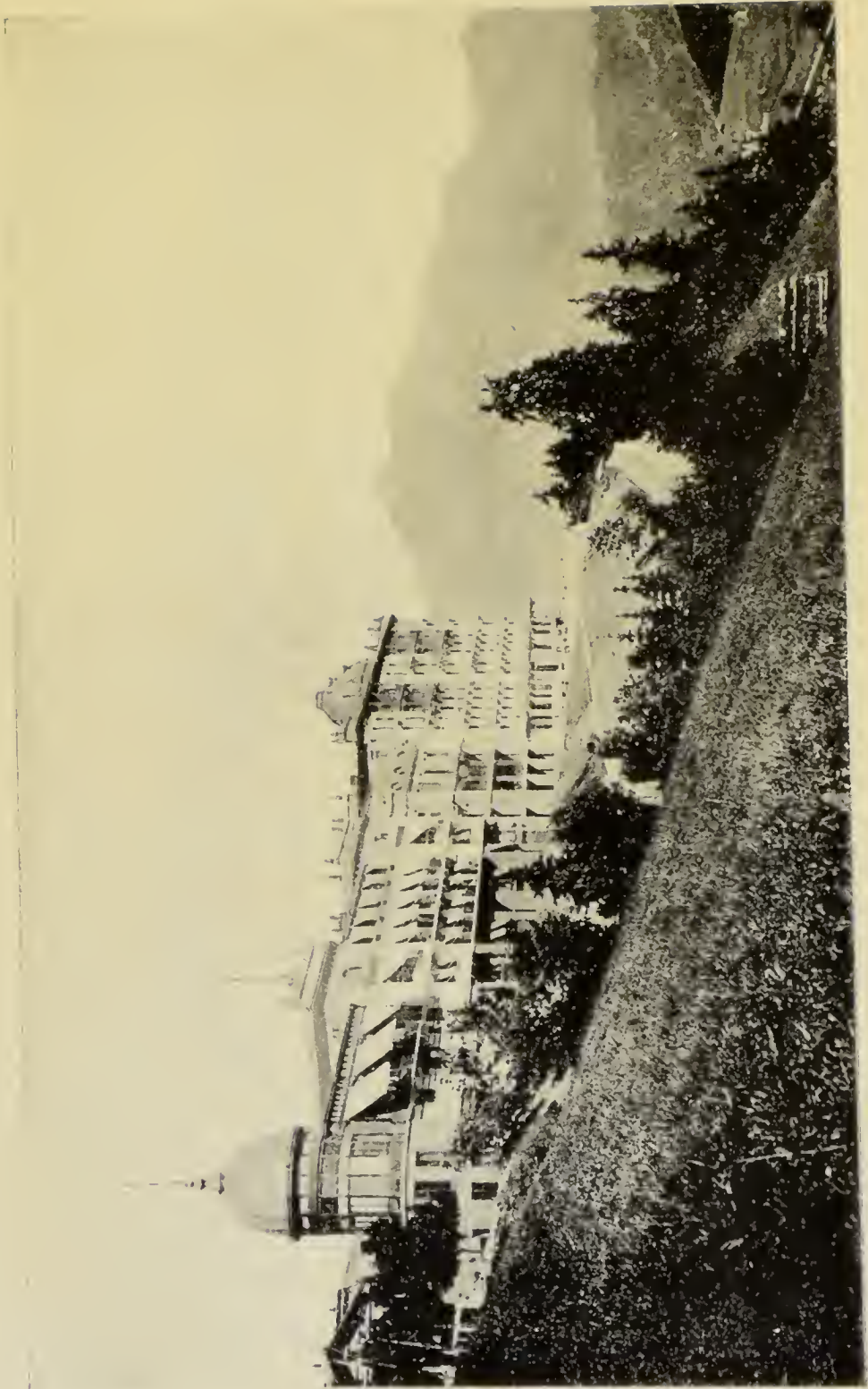


FIG. 36.—THE SANATORIUM DU MONT BLANC, LEYSIN

THE LEYSIN SANATORIA.

Leysin, which has the highest parsonage in the Canton of Vaud, is situated above the lower part of the Vallée des Ormonts, on a wide plateau at the foot of the Tours d'Ai. The valley runs from north-east to south-west, the sanatoria being on its northern side, above the usual fog and cloud level for this part of the Alps. The *soil* is dry and calcareous. *Altitude* about 1450 metres. The district is said to have rather more sun than Davos. Seven sanatoria for full-price patients are to be found here, in addition to one for poor children, and a larger, popular sanatorium for men and women. *Access*: By electric rack and pinion railway from Aigle.

THE SANATORIUM GRAND HOTEL

is a five-story stone *building*, with patients' bedrooms mostly on the south side, the kitchens, store-rooms, servants' apartments and staircases being on the north side. The dining-saloons, drawing-room, winter garden and glazed galleries for exercise indoors are on the ground floor and basement. There is also a large rest-shelter, 30 metres long, on the eastern side of the building, and another in the grounds. The bedrooms are 3 metres high; each has a chimney for ventilation, and double windows, the tops of which can be separately opened. There are roomy balconies in front of most of these. The second floor communicates with the forest by means of a footbridge. The building is *heated* by low-pressure steam; *lighting* by electricity.

THE SANATORIUM DU MONT BLANC,

at one time called an hotel, is a five-story *building* with a tower at the western end surmounted by a cupola (fig. 36). Balconies run round this tower and along the southern side of the rest of the building. The rooms and arrangements are much the same as in the Sanatorium Grand Hotel.

THE SANATORIUM DE CHAMOSSAIRE

lies to the east of the foregoing. Arrangements somewhat simpler. The above three sanatoria are under common management.

THE ENGLISH SANATORIUM.

A compact six-story *building* with balconies to most of the south rooms, and somewhat similar arrangements to the foregoing institutions. English nurses are kept in the sanatorium.

THE SANATORIUM POPULAIRE.

A four-story *building* with balconies to some of the rooms. A double-tier verandah runs the length of the building in front of the basement and ground floor.

THE MONTANA SANATORIUM.

Montana forms a plateau overlooking the village of Sierre (Valais), protected by an amphitheatre of mountains to the north, and by pine-woods to east and west. In front of it is a panorama of mountains, including the Bietschhorn and the Simplon, the glaciers of Zermatt, the Matterhorn and Mont Blanc. This plateau enjoys a large proportion of sunshine with very little fog. *Altitude* of the sanatorium: 1500 metres. *Access*: By carriage (three and a half hours) from Sierre, which is on the Simplon railway.

Buildings: The sanatorium is a four-story building with large balconies at the western end, and a large dining-saloon with winter garden over the kitchen at the eastern end. The rooms are placed north and south of the corridor. They have œbolithe floors, with rounded angles, a fanlight over the window, but none over the door. *Heating* is by low-pressure steam. *Lighting* by electricity. There is one bathroom; the consulting-room is on the first floor, a drawing-room on the ground floor, two W.C.'s on each floor. No lift. Three of the rooms have two beds apiece; the rest being single-bedded.

The building is of stone, with wooden balconies.

THE BEAUREGARD SANATORIUM

is a large *building* consisting of three blocks united by fresh-air galleries. The bedrooms are all on the south side; *heating* is by low-pressure steam; *lighting* by electricity. There is a complete hydropathic installation; also a passenger lift. The dining-saloon

and kitchen are in an annexe on the level of the second floor. The floors are of cement with rounded angles and linoleum covering; the walls covered with washable paper. The sanatorium is being reorganized.

THE GENEVESE SANATORIUM FOR THE PEOPLE,

at Clairmont-sur-Sierre, is surrounded by a semicircle of mountains covered with pine-woods, being open to the south-south-east. It is a four-story *building*, the centre of which is a little higher and more prominent than the rest, and separates the men's from the women's section. The centre contains the quarters of the medical director and lay manager, the dining-saloon on the south side, and underneath the kitchen department. The wards comprise four with six beds apiece, in the wings, eight with three each, two with two beds each, and ten single-bedded rooms in the attics. The lavatories, etc., are separate for each section, a pair for each floor. There is an easy staircase, but no lift. A large verandah runs along the south side in front of the basement; it is fifty metres long and is divided into small sections by glazed partitions. *Heating* is by low-pressure steam, *lighting* by electricity. The incubators in the laboratories, sterilizers, and flat-irons in the laundry are also heated by electricity. There are fanlights over the large windows, and over the doors into the corridors. The north side is exclusively devoted to administration, sanitary pavilions. There are seven bathrooms, two douche-rooms, and fifteen W.C.'s.

CHAPTER LXVI.

EASTERN SWITZERLAND.

INCLUDING Grisons, Glarus, St. Gallen, Appenzell, Thurgau, Zurich, Schaffhausen, Zug, Schwyz, Uri, and Tessin.

Arosa

is a small hamlet in a branch of the Schaufiggerthal, about six hours' drive from Chur. The road ascends the valley of the Plessur in an easterly direction as far as Langwies, where it takes a sharp turn to the south-west. The Arosa valley itself forms a long oval, surrounded on all sides by snow mountains, and rises from 1750 to 1892 metres above sea level. It is divided by the Tschuggen Mountains on the north into an upper and a lower part; and its sides are clothed to a height of about 1900 metres by pine-woods, broken by two fine lakes.

The climate has the usual characteristics of an Alpine resort: with a little more sunshine than Davos, and rather more wind. Altogether the climate of Arosa is regarded by Dr. Ewart as more stimulating than that of Davos.

Chur is connected by rail with all the chief towns of Europe. There are several sanatoria in Arosa, and a number of hotels and pensions which receive invalids.

DR. JACOBI'S SANATORIUM

is *situated* on the northern side of the valley, sheltered to the north by the Tschuggen, to the east by pine-woods and the approximation of the mountains; while it is open to the south and west. It is isolated from other buildings by private grounds. *Altitude*: 1860 metres.

Buildings: The sanatorium consists of an old and a new Kurhaus
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FIG. 37.—THE AROSA SANATORIUM

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Name and Locality.	Opened.	Terms in Frs. per Day.	Medical Officers.	Cases Ad- mitted.	Beds.
GRISONS—					
Arosa—					
Dr. Jacobi's San.	—	9½-15½	Dr. Gwerder	E., M.	115
Wald San.	1910	14-22½	Dr. W. Roemisch and Dr. Hartmann	E., M.	75
Villa Dr. Herwig	—	—	Dr. Herwig	E., M.	50
Kindersanatorium	—	—	Dr. P. A. Pedolin	s., E., c.	15
Villa Gentiana (English San.)	—	—	Dr. E. C. Morland	E., M.	17
Grisons Pop. San.	proj.	—	—	E.	—
Villa Montana	—	—	—	E., M.	—
Davos Platz—					
Dr. Turban's San.	1887	13-17	Dr. Turban	E.	100
Davos Platz San.	—	14-19	Dr. A. Schnöller	E.	—
Schweizerhof San.	1903	12	Dr. H. Staub	E.	120
San. du Midi	—	—	Dr. Michel	E.	60
Reform San., Pons Bern- hard	—	—	Dr. H. Frey	E.	35
Alexander Haus	1882	—	—	A.	60
St. Josephs Haus	—	—	—	A.	46
Schulsan, Fredericianum	—	—	—	c.	40
Dutch San.	1897	4	Dr. Spengler, Dr. Schuurmann	E.	50
Q. Alexandra San.	1909	5½	Drs. Noble and Fairley	E.	54
Davos Dorf—					
New San.	1896	11-16	Dr. Philippi	E.	56
Davos Dorf San.	1898	—	Dr. Dönz	E.	70
International San.	—	—	Dr. Humbert	E.	48
Dr. Dannegger's San.	1902	—	Dr. Dannegger	E.	55
San. Pisch	—	—	Dr. Volland	E.	30
San. in der Stille	1896	2-5	Dr. Nienhaus (for Basel)	E.	90
Davos Wolfgang—					
German San.	1902	3·50-6	Dr. Kölle	E.	80
Davos Clavadel—					
Clavadel San.	1901	14-22	Dr. H. Bodmer	E.	58
Davos Schatzalp—					
San. Schatzalp	1901	14·50-27·50	Dr. Spengler, Dr. Neumann	E.	115
GLARUS—					
Stachelberg—					
Braunwald San.	1897	1½-4	For Glarus	E.	34
ZURICH—					
Wald San.	1898	—	Pop. San. for Zurich	E.	140
„ Children's San.	1909	—	—	E., c.	—
Aegeri San.	1885	—	—	s., E., c.	—
Krankenheim Rehalp	—	2	For the City of Zurich	A.	36
ST. GALLEN—					
Knöblisbühl San., Wal- lenstadt	1909	—	For St. Gallen	E.	50
ZUG—					
Aegeri San.	in con.	—	For Zug	—	—
TICINO—					
San. del Gotthard, Ambri	1904	full pr.	Dr. J. Biland	E.	—

side by side, and a separate building for laundry and disinfection. The ground floor of the old Kurhaus (fig. 37) is mainly occupied in front by three common rooms, behind by the kitchen department. In front of it is a deep verandah, protected at the eastern end by the projecting music-room, and ending at the western end in a pavilion. On the ground floor of the new Kurhaus, which stands back some 10 metres, are a ladies' room, offices, consulting-rooms, etc., and on the south front another verandah. Uniting the two buildings is a large dining-saloon. Each building has a terrace in front of it, and on a lower level a rest-shelter. There are two upper floors in the new Kurhaus, three in the old, which are occupied by bedrooms. Most of these have at least one window to the south, and are of good size; some have separate balconies. Every room is lined with wood, and has linoleum-covered floors. *Heating* is by low-pressure steam; *lighting* by electricity. The baths and douches are partly in a built-out pavilion at the western end of the new Kurhaus, partly next the kitchen in the older building.

THE WALD SANATORIUM

stands on a mountain spur 55 metres above the village of Arosa and 1830 metres above the sea level. It is surrounded by pine forests and commands fine views of the neighbouring valley and mountains.

The *building* is of six stories, with the entrance on the north side, the dining-saloon at the eastern end of the ground floor and the kitchen department in a separate wing connected with the dining-saloon. Other common rooms are on the ground floor, as well as the consulting-rooms and bathrooms, the laboratories and douche-rooms being in the basement. This medical section is separated from the rest of the building by glazed doors.

There are three public sitting-rooms on the upper floors. The bedrooms are arranged around corridors running east and west, the ends of which are blocked. Most of the bedrooms have access to a balcony divided into sections by glazed partitions, and approached by wide French windows allowing a bed to pass. There are double doors and sound-proof walls, switches to turn the electric light on and off from the bed, and arrangements to bolt or unbolt the bedroom door without getting out of bed. The internal decorations

are in approved sanatorium style. There are in all fourteen bathrooms and numerous lavatories. *Heating* is by low-pressure steam.

Staff: Three resident physicians.

Davos

is situated amongst the mountains of Grisons in a high funnel-shaped valley traversed by a little torrent, the Landwasser. The valley runs from north-east to south-west at an altitude of about 1560 metres; it is twelve kilometres long and one wide, and is protected to the north by a high chain of snow mountains, and to the east by a strongly projecting mountain spur. The valley to the south is covered with fields and surmounted by pine-woods. At the northern entrance is Davos Dorf; then the valley forms an angle and enlarges: and here is Davos Platz. To the north-east of Davos Dorf is the Davos Lake. Davos Dorf receives more sun than Davos Platz, but is much less sheltered from the north. Owing to the growth of population the two are continuous; but Davos Platz is more crowded, and is served by a railway from Landquart. A tram line runs between the two, as well as the railway. The population consists partly of consumptives, partly of pleasure-seekers. Facilities abound for skating, tobogganing, sledging, snowshoe running and the like; also for concerts and entertainments in crowded halls. The place has very great climatic advantages, but also the dangers inseparable from a fashionable resort.

There are a number of hotels and pensions, some of them very well arranged, and possessing many of the structural features of medical sanatoria, but without their medical control of the arrangements. Most of the hotels charge from 7 frs. 50c. to 14 frs. per day; in the pensions the terms are from one to two frs. less.

DR. TURBAN'S SANATORIUM

is in the south-west part of Davos Platz on the mountain side. Sheltered by mountains and forests to the north, it has a fine view to the south and south-west over meadows and the town of Davos to the mountains beyond. *Altitude*: 1573 metres. *Grounds*: 7 hectares adjoining the grounds of the Kurverein, to which

patients have access on payment of a subscription. The sanatorium consists of four *buildings* united by covered passages, and of an isolated villa for the chief medical officer and the managing director. The main building is a long four-story erection having a covered verandah in front of the ground floor, and open balconies to the other floors. In the basement are the administrative rooms and cellars, the laundry, disinfecting and heating apparatus. On the ground floor is a large dining-saloon, with room for 120 guests; a drawing-room, reading-room, billiard-room, office, doctor's rooms and laboratories, gymnasium, douche and bathrooms. Above these are patients' bedrooms on three floors, all on the south side, and opening into well-lighted corridors, the staircase being also to the north. The largest of the other villas is to the east, the remaining two being at the upper or western end. The bedrooms average 57 cubic metres in capacity. They are *heated* in the main building by low-pressure steam pipes, the rest of the establishment being served by porcelain closed stoves or hot-water pipes. In each bedroom of the main building is a radiator which can be regulated, and which has a ventilating inlet next to it. On the opposite wall is an outlet leading to a chamber under the roof. In addition to this, the windows, which are French windows with an upper hinged pane, are always kept partly or entirely open. There is a similar arrangement over the doors of the balconies. The walls are of wooden panels with rounded angles. The floors are covered with linoleum. The *lighting* is by electricity, the bedrooms having bed and table lamps which can be shaded.

The sanatorium belongs to a company, but is under the control of Dr. Turban and his assistant.

THE NEW DAVOS SANATORIUM

is in the English quarter, on the boundary between Davos Platz and Dorf. From its position it receives a large amount of sunshine. It has a southerly aspect, and consists of a four-story stone building and of a chalet in Swiss style, both connected by a covered walk with the fresh-air gallery, which is twenty metres long. The kitchen department and heating apparatus are in the basement of the main block, the dining-room, drawing-room and

reading-room on the ground floor, with entrance, W.C.'s and office to the north, staircase to the west. Consulting- and waiting-rooms are on the first floor. Patients' bedrooms are placed on all sides, but mostly to the south and east. Many have balconies: all have wood-panelled walls and linoleum-covered floors; electric *lighting*; *heating* by low-pressure steam pipes; double doors and windows, the latter with a fanlight.

The chalet is a three-story building with ten patients' bedrooms. These have parquet floors, but are otherwise like the rest. The medical officer's quarters and laboratory are in this building.

The place is not exclusively for tuberculous patients.

THE DAVOS DORF SANATORIUM

stands back from the road in an elevated position, where it receives plenty of sunshine. It is a four-story stone building with all the patients' bedrooms to the south of the corridors, and offices to the north. In front of the basement is a verandah, above this a balcony and smaller balconies on other floors. Hydraulic lifts serve every floor. *Heating* is by low-pressure steam; *lighting* by electricity. Attached to the main block by a passage is an annexe, the Villa Maria.

THE CLAVADEL SANATORIUM

stands on a plateau on the southern slope of the Jacobshorn above the entrance to the Sertig valley, about two miles from Davos Platz. It is protected on three sides by mountains and extensive forests, and is said to enjoy more sunshine in winter than Davos itself. *Altitude*: 1712 metres.

The *building* is of four stories, with long balconies to every floor and two well-ventilated rest-shelters. There are a number of large and airy public rooms, and a complete medical department. Bedrooms are not exclusively on the south side. They have double doors, and hot and cold water laid on. Internal decorations in good sanatorium style. Two bathrooms on each floor. *Lighting* by electricity. Central steam *heating*.

Staff: Includes two resident physicians and some trained nurses.

REFERENCE.—"Lancet," 8 July, 1905.

THE SCHATZALP SANATORIUM

is a large building on a plateau above Davos Platz, with which it is connected by a funicular railway. Behind it to the north is the mountain; spread out in front are the pine-woods overhanging Davos. From its position, it receives more sunshine than Davos, and is free from the drawbacks arising from the larger population of the latter. *Altitude*: 1865 metres. The sanatorium has over forty hectares private *grounds*, and enjoys an extensive view over the Davos valley.

Buildings: The ground floor contains a number of large day rooms, as well as laboratory, consulting-room, and doctor's quarters. In front of it is a long-covered way leading at the sides to two rest-shelters. The three upper floors consist mainly of bedrooms placed north and south of the corridors, with here and there a solarium. Most of those on the south side have balconies. Bathrooms, staircases, W.C.'s, linen-rooms, and those for the servants are entirely on the north side. The kitchen is on the ground floor to the north-east, and projects beyond the other floors. *Heating* is by low-pressure steam, *lighting* by electricity. Electric bells and telephone connect the various parts of the building. There is a steam disinfecter and a complete douche and bathing department on the ground floor. The rooms are large, with painted panelled walls, and floors covered with linoleum over felt. Wardrobes are let into the walls, and furniture is washable. The walls are constructed so as to be sound proof. There are double doors and windows, the latter with ventilators and outside blinds. There is a covered way to the railway station; telegraph and telephone to Davos. Dr. Neumann lives in the building; Dr. Spengler visits it every day from Davos.

THE SANATORIUM "IN DER STILLE"

was founded by a society at Basel, on the initiative of the medical profession and with the help of public subscriptions. It is placed at the foot of the Seehorn, near the entrance to the Fluelathal, in a very sheltered position, with a south-westerly aspect, and protected



GROUND FLOOR



SECOND FLOOR

FIG. 38.—THE SANATORIUM "IN DER STILLE"

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to the east and west by pine-woods. *Grounds*: two hectares. *Altitude*: 1600 metres. The *building*, of which the administrative portion has been built for 100 patients, is of stone, and forms an oblong block, with a wing projecting north from the eastern end, containing kitchen, dining-room and manager's and medical officers' quarters (fig. 38). In the main portion are, in the basement, heating apparatus, laundry, disinfectory, workroom and storerooms. On the ground floor, office and manager's rooms, porter's room, waiting- and consulting-rooms, laboratory, bath- and douche-rooms, a large vestibule on the north side, and two large common rooms on the south side for the two sexes. There is another common room at the junction with the wing. Along the southern side is a verandah, the floor of which is sunk a few steps; it is of wood over cement, and rests on a projecting part of the basement. The upper floors contain bedrooms on the south side, chief medical officer's quarters, vestibule, bathroom, lavatories, etc., on the north side; the nurses' rooms and staircases being also at the back. The bedrooms contain from one to four beds apiece, about one-third being single-bedded. The stairs and foundations are of cement; the floors in patients' quarters of oak or boxwood, or else of pine covered with linoleum; in the kitchen of terrazzo. The inner walls are smooth and free from mouldings, with rounded corners and angles, and covered with oil-coated and washable linen paper. The windows are double, with fanlights above. In the laboratory, douche-rooms and bathrooms there are enamel-painted walls; in the common rooms and dining-saloon breast-high wooden panelling. The furniture is of plain lacquered pine-wood. *Heating* is by low-pressure steam; *lighting* by electricity.

Financial: The cost is said to have been 650,000 frs.; the daily cost 3·50 frs. per day.

THE DUTCH SANATORIUM,

for poor people of Dutch nationality, was founded by private society, and is maintained chiefly by voluntary subscriptions from residents in Holland. The house (not specially constructed) is on the hillside, sheltered from the north and west by mountains. It is in the usual Swiss style, and consists of basement, three upper floors and attics.

The bedrooms, which have from one to three beds apiece, are large ; their walls are of varnished wood or covered with washable paper ; each has a closed stove and plain wooden furniture, and linoleum-covered floor. The windows are French casements with a fanlight above ; the *lighting* is by electricity. Most of the rooms on the south side have balconies. There are also three large verandahs at the western end of the house, of which the lower is glazed, the upper ones being provided with solid roofs and thick blinds on the windy side. There is a suitable bathroom ; W.C.'s with good flush ; sewers connected with those of the town. There are two common rooms. *Altitude* : 1560 metres.

The *staff* includes a resident medical officer and a trained nurse.

THE GERMAN SANATORIUM

is not far from Wolfgang Station on the Lake of Davos. It is intended for middle-class patients of German nationality, and is built in the usual sanatorium style, with south rooms, rest-shelters and verandahs in front, and corridors, offices, bathrooms, etc., behind. There are a few north rooms for companions of patients. The bedrooms have from one to four beds apiece.

Another wing was added in 1906 (Kaiser Wilhelm II Haus) for the more serious cases ; in this part the rooms lead directly to the rest-shelters, and there is a separate dining-room. A third wing (Olga-Haus) was built in 1909.

THE QUEEN ALEXANDRA SANATORIUM,

or English sanatorium, at Davos Platz, looks south-south west and is placed on the mountain side above the town, close to the pine forest.

It is a severely plain-looking building of five stories, provided with a passenger lift, and balconies on every floor, *lit* with electricity, *heated* by steam, each room having its own radiators, while the lounge has an English open fire-place. All the bedrooms are single-bedded, and all but four face south-south-west and have their own balcony ; the other four face south-east and have the use

of a public balcony. The public rooms include dining-hall, drawing-room, reading and writing-rooms and lounge. They are planned for extension to 120 beds.

Staff: A resident medical officer, matron, and nurses, all British. Management is in the hands of a Board of Management consisting of British residents and visitors in Davos.

Admissions through the Secretary at the sanatorium ; one of the Honorary Secretaries in England (Dr. Ewart, 31 Upper Brook Street, London, W. ; D. Vesey, Esq., 3 Camp View, Wimbledon Common, S.W.). Limited to British and American subjects.

REFERENCE.—“ Brit. Journal of Tuberculosis,” July, 1908.

THE BRAUNWALD SANATORIUM,

for Glarus and neighbouring cantons, is on an elevated terrace near the baths of Stachelberg, in the valley of the Linth, 600 metres above the stream, and 1180 metres above sea level.

Surrounded by woods and meadows, it looks south-south-west and is well sheltered by mountains from north-east winds. It has a dining-room, workroom, fresh-air gallery, and rooms for gymnastics and games in bad weather, as well as wards containing from one to three beds apiece. There are two windows to each bedroom, surmounted by fanlights. Air space is 30 cubic metres per head. The walls are wainscoted to a man's height, and all corners rounded. *Heating* is by hot-water pipes ; *lighting* by electricity. Furniture of varnished wood.

REFERENCE.—“ British Medical Journal,” 22 Oct., 1904.

WALD SANATORIUM,

for the canton of Zurich, is on the Faltigberg, a little north of the southern end of the lake of Zurich. *Altitude* : 907 metres. It has thirty hectares of land, including both woods and meadows. The building has a southerly aspect. It consists of a central administrative block and a three-story pavilion on each side for men and women respectively, with open-air corridors between. Patients are also received from Schaffhausen.

THE GOTTHARD SANATORIUM,

at Ambri Piotta, near Airolo, is a beautiful well-planned modern building of four stories, with numerous common rooms, verandahs and shelters, and luxurious arrangements. The bedrooms are on the upper floors, the dining-saloon in the eastern wing, the medical department in the western wing of the ground floor. *Altitude*: 1170 metres.

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